

CHEMICAL MARKETS

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No. 1.

What of 1932?

CONSERVATIVE executive opinion in chemical industries is beginning to formulate itself into the very definite belief that, probably within the next three months, or most certainly within the next six, there will be a marked change in the business situation. This opinion is based upon two pertinent facts. In the first place, domestic business has been in a stalemate for virtually two years, and already there are signs that the accumulated, normal, replacement demands of the country are beginning to be felt. On the other hand, the strain upon the purely financial resources of the country, notably upon credit and collections, is also beginning to be rather seriously felt. Which of these important forces will exert the greatest pressure will become a matter of serious importance in the near future.

DURING the past two years every industry in the country has been going through a readjustment period. Especially during the past six months the conviction that the depression was a serious readjustment of all values has brought about drastic curtailments of expenditures in every direction. Most companies—big or small—have made serious efforts to work out new budgets.

The first quarter earnings of 1932 will be extremely revealing as to the success of these strenuous efforts. If our industries have worked down to the basis of profitable operation upon the new level, the encouraging signs in the balance sheet will be one of the greatest possible restorers of confidence.

IT is almost impossible that the world's business should continue stagnant for a much longer period. Are the recuperative forces going to urge business upward and onward again, or will the financial strain of the long prostration cause a serious crisis?

IN OTHER words, we are on the way towards a definite recovery with a continuous hardening of gold and the corresponding increasing purchasing power of the dollar, or else we are going into a financial panic, undoubtedly induced by international complications, which will conceivably lead to a worldwide money inflation. There is a big choice among these alternatives. But even if the most unfavorable one appears, such a violent breaking of the economic jam seems desirable against the dead-lock of the past two years.

DU PONT DYESTUFFS INTERMEDIATES

for SPOT or
**CONTRACT
SALE**

1: 2: 4 Acid
Acetyl-ortho-Toluidine
Alpha-Naphthol
Alpha-Naphthylamine
Alpha-Nitronaphthalene
Amino G Salt
Amino J Salt
Aminoazobenzene sodium
Sulfonate
Aminoazotoluene
Aniline
Benzidine (Base)
Benzoic Acid, Technical
Beta-Hydroxynaphthoic
Acid
Beta-Naphthylamine
Broenner's Acid
Chicago Acid
Chromotropic Acid
Cleve's Acids
Cresidine
Dianisidine (Base)
Diethylaniline
Diethyl-meta-Aminophenol
Dimethylamine
Dimethylaniline
Dinitrobenzene
Dinitrochlorobenzene
Dinitrophenol
Dinitrostilbenedisulfonic
Acid
Dinitrotoluene
Dinitrotoluene Oil
Di-ortho-Tolylthiourea
Diphenylamine
Epsilon Acid

Ether
Ethylacetanilide
Ethylbenzylaniline
Gamma Acid
G Salt
J Acid
Koch Acid
L Acid
Laurent's Acid
Metanilic Acid
Meta-Nitroaniline
Meta-Phenylenediamine
Meta-Tolylenediamine
Meta-Xylidine
Michler's Ketone
Mixed-Mononitrochloro-
benzenes
Mixed-Mononitrotoluenes
Mixed-Mononitroxylene
Mixed-Toluidines
Mixed-Xylidines
Monochlorobenzene
Monoethylaniline
Monoethyl-ortho-Toluidine
Nevile & Winther's Acid
Nitrobenzene
Nitrobenzene-meta-
Sulfonic Acid
Oil of Mirbane
Ortho-Anisidine
Ortho-Aminophenol
Ortho-Dichlorobenzene
Ortho-Nitroanisole
Ortho-Nitrochlorobenzene
Ortho-Nitrophenol
Ortho-Nitrotoluene

Ortho-Toluidine
Ortho-Toluidine-meta-
Sulfonic Acid
Para-Aminobenzoic Acid
Para-Aminophenol (Base)
Para-Dichlorobenzene
Para-Nitroaniline-ortho-
Sulfonic Acid
Para-Nitrobenzoic Acid
Para-Nitrochlorobenzene
Para-Nitrophenol
Para-Nitrosophenol
Para-Nitrotoluene
Para-Phenetidine
Para-Toluidine
Peri Acid
Phenyl-alpha-Naphthyl-
amine
Phenyl-beta-Naphthylamine
Phenyl Gamma Acid
Phenylmethylpyrazolone
Phenyl Peri Acid
Picramic Acid
Picric Acid
R Salt
Resorcinol, Technical
S Acid
Schaeffer Salt
Sodium Metanilate
Sodium Naphthionate
Sodium Para-Nitro-
phenolate
Sodium Picramate
Sodium Sulfanilate
Sulfanilic Acid
Tolidine (Base)

ORGANIC CHEMICALS

E. I. DU PONT DE NEMOURS & CO., INC.

Organic Chemical Department, Wilmington, Delaware



What Can Congress Do?

Since the stock market crashed, like a sudden summer thunderclap, twenty-six months ago, there have been two minds about the fundamentals of the depression. One group has maintained that it was a temporary jam caused by over-production. Another school has held that it was a readjustment of values, a deflation of all sorts of war-born excesses and a passing along to the consumer of the savings which have been effected, but not yet distributed, by the technological advances of the past twenty years.

The first group naturally have made strenuous efforts to hold up prices, to maintain wage scales, to speed up consumption, to patch up and bolster up the stalled engine of business. As this has been the popular conception of the depression, these are naturally the remedies that have been prescribed in Washington. Pretty obviously Congress has reassembled still in this optimistic frame of mind, although it is increasingly evident that the people of this country are becoming more and more convinced that we are passing through a very fundamental readjustment of values. Once this belief becomes the conviction of the majority, then Congress will be able to perform some of the major operations that will help, but hurt. It will be a great pity if our politicians are so dumb that they miss sensing this change in the popular point of view. It will be a glorious opportunity thrown away, for it will mean that Congress will continue to tinker with palatives, and fail to come to grips with such questions as taxes and tariff, the federal budget, foreign debts, and the whole flock of problems associated with unemployment. These are all matters in which the action of legislation can greatly help or seriously retard the reestablishment of a new economic equilibrium.

Public Instruction

No one even slightly acquainted with chemical industry believes that Muscle Shoals is essential as a nitrogen producing unit, either for peace-time fertilizer needs, or as a possible wartime protective measure. Unfortunately, those who by training and experience are capable of knowing this are in a very small minority. If by some means this truth, along with the fact that the Shoals units are hopelessly outmoded, could be widely disseminated and the general public acquainted with the real situation, it is possible that they in turn would bring pressure upon Congress to stop petifogging about an issue that should have been decently buried years ago.

Some ray of hope is, therefore, discernible when the New York "*Sun*" devoted over a column of editorial space to dispelling some of the popular fallacies, calling upon the report of the recent State-Federal Muscle Shoals Commission which confirmed the findings of Major-General Hof, Chief of Ordinance of the Army that the nitrogen plants are no longer necessary as a war reserve. Says the Commission's report:

"Plant No. 1, the first direct synthetic ammonia plant to be built outside of Germany, is too faulty to be of any possible value, and is not necessary or suitable for experimental purposes. Plant No. 2, designed to make cyanamid was considered the best of its kind in 1918, but subsequent developments in the nitrogen industry, together with improvements in the cyanamid process have largely destroyed its value. In view of these conditions, Muscle Shoals seems to possess at this time only meager economic possibilities for the production of nitrogen."

We thank the "*Sun*" in behalf of the industry for its aid, but frankly, where it is most needed is along Main Street in the editorial columns of the *Gazette-Reporter-Chronicle*—or what have you. Too often, however, the link-up between the rural press and the representation in Washington is too close to expect unbiased advice to either readers or constituents.

Sitting aimlessly by in the next few months while Congress wrangles over three or four Shoals plans will not help. Horace Bowker has the right idea. He is frankly seeking all the publicity he can get to lay the real truth before both the farmer and the man in the large city. Other big men of the fertilizer and chemical industry should come forward and by interviews, radio addresses, or by any other legitimate means lay before the public at large the indisputable folly of either governmental or farmer operation of Muscle Shoals.

Price Stability

Alcohol companies have shown poor earnings, practically without exception, even severe losses for the past year. Moreover, these losses have been greater than in any other group in the chemical field. The recent rise in prices will, therefore, be welcome to the companies themselves and their stockholders. Even buyers, now so thoroughly accustomed to naming their own figure for most everything bought, will, in most instances, see the wisdom of such a move. No branch of industry can lose money indefinitely without the consumer being the chief sufferer in the long run.

For the first time in five or six months and the third time since the beginning of the present depression declines in the twenty representative chemicals employed to chart the

course of the market have been offset by increases and, indeed, if it were not for the unfortunate situation in the bichromate industry, the trend would have been decidedly upward. The severe decline in sodium bichromate can hardly be attributed solely to depressed conditions. There the reason is distinctly the entrance of a third producer into a field that for several years has been much less competitive than most other industrial chemical lines.

Many signs sustain the belief that chemical prices are stabilizing. The alcohol industry will deserve all the distinction that will undoubtedly accrue to it should time disclose that it has led the way back to price security.

Bicarbonate Rumors Quite an important part of our monthly task is to put before our readers an honest statistical picture of chemical industry. Of late this has not been a pleasant task. Our battered and under-nourished optimism, revived by the grace of another new year, is sorely jolted by the figures of the month just past. It is well to remember that December is proverbially a bad month in the industry, and it is wise to hunt for any encouraging signs we can discover.

Depression—as a state of mind—causes all sorts of inefficiencies. It is proverbially bad for the digestion. This will be a boon to the sodium bicarbonate market, since there is bound to be a vastly increased consumption of this bland and efficacious alkali to correct sour stomachs induced by sourer minds. We are not unfriendly to the bicarb makers; but we should like to see more depression indigestions cured by a little more cheerful courage—even, if necessary, of that Dutch brand of courage closely associated with alcohol consumption.

Joking aside, it would be very helpful if we might all resolve not to retail depressing rumors. We won't violate the pledge at the very moment we are trying to persuade you to sign it; but it is no secret that whispering campaigns about certain companies, certain banks, certain nations are common enough. Usually based upon the reliable authority of "a friend of mine whose laundress is the cousin of the elevator boy at the Winter Garden", these stories are considered flat unless they deal in billions of called notes or cancelled contracts. You can easily identify the general class of story. You recognize that most of them are quite unfounded in fact and that many of them are seriously dangerous. A moratorium upon such yarns!

Quotation Marks

Men point to our inexhaustible resources, our invincible energies—but relief lies in ourselves. Toilers of the sea do not sit moaning on the shore. Conductors of great industries do not wait for opportunities; they make them. Bankers do not refuse to make loans on good assets and good character simply because they are in trouble; they nourish assets and character by fresh loans well guarded. Railroads do not refuse transportation for the reason that charges are insufficient to make dividends; they add new equipments, provide more alluring services, try to fit their rates to the ability to pay, and carry on. Merchants sell goods cheaper that they may sell more. Wage earners accept reductions that factories may stay open and their earning time be extended.—*Financial Chronicle*.

Everybody is a chemist, even the cook. In fact, all chemical operations are performed in an up-to-date kitchen. Likewise, all industries have need of some knowledge of chemistry today.—*James A. Branegan, Pres., Kali Mfg. Co.*

Everything we have done for the worker is predicated on his having work. If we deny him this, we deny him everything.

To face the situation squarely, the depression of 1929-31 demonstrated conclusively that American executives must abandon some traditions of business if they would assist in eradicating the black dot of mass unemployment and the fear that goes with it. The burden of depression should be borne by all.

Our modern industrial machine demands a modern operating policy based on the simple formula: Keep everybody employed by distributing the work; give everybody leisure by distributing the leisure; make the leisure desirable by making it usable.

It is fear that turns an accident into a disaster, a recession into a depression.

We have been giving so much thought to turning out goods and putting them up in attractive packages that we have given no thought to packaging leisure in usable units.—*L. C. Walker, Distributed Leisure*.

The South is more than a potential asset to the United States. It is an actual developing asset. It will be a pity if, because of legislative extremes, this source of wealth creation is stopped and diverted elsewhere.—*Manufacturers' Record*.

Fifteen Years Ago

(From our issues of January 1917)

Geological Survey is drilling for potash in Potter county, Texas.

J. L. Riker's estate, founder of the firm J. L. & D. S. Riker, finally appraised at \$7,000,000.

Muriate of potash is quoted at \$475 per ton.

Du Pont Co., offers \$5,700,000 for the plants of Harrison Brothers & Co.

Perkin Medal awarded to Dr. Ernst Twitchell.

John F. Queeny reelected President, Manufacturers' Association of St. Louis.

Inflation and Deflation

By Stephen Leacock

A LITTLE while ago—just after the War ended, wasn't it?—everybody was absorbed in the idea of making things "bigger and brighter." There was a movement for a "bigger and brighter London," "bigger and brighter schools," "bigger and brighter gaols." These mass ideas always take effect. Things really began to get bigger and bigger, and brighter and brighter. Houses grew higher; apartments got larger; the streets got wider; the hotels went up; servants went up; food went up. Trains went faster; 'buses went still faster; motor-cars went faster still. Babies ran at two; children bicycled at six; old people flew at sixty. Everything inflated and expanded. Narrow people got broad. Heavy people got light. Small-minded people got wider ideas. The whole race improved. There were beauty contests in every village; marathons for old men; efficiency tests for imbeciles and imbecility tests for the efficient. The sheer lightness and brightness of things set everybody on the move. All the people in town rushed to the seaside. All the people who lived by the sea flocked to the town. Tourists filled all the hotels and the hotel men went on all the tours. The continent was full of Americans and Americans were full of the continent.

It began to get so big and so bright there really wasn't any night. Night was extinguished in a glare of light and a babel of sound. All round the bright world jazz called to jazz, and radio squawked to radio. People in London listened at midnight to an anthem sung by priests in Thibet tomorrow morning; New York watched the pictures of the Oxford and Cambridge boat-race hours before it happened.

And everywhere was money—money, money, lots of it. "Take it, my dear fellow; I don't need it. How much did you say? Ten pounds? Better have twenty; you might need it." Jones lent to Smith, Smith lent to Brown, and Brown lent to Jones. Tokio floated a loan in New York, and New York floated it back to South America. Money floated like scum all over the ocean. Also investment. People without a penny invested thousands. Shopkeepers bought up mines and miners bought chain stores. Bankers bought farms and farmers bought banks.

Whether you see "the doughnut" or "the hole"—here's an annual review article worth more than twenty pages of mixed platitudes and statistics from the typewriter of some well-known industrialist's secretary and rubber stamped with the big man's signature. It was written for British consumption—in "The London Spectator;" but Stephen Leacock always was clever in the use of dialect and you needn't know the current discount on pounds sterling to chuckle over his racy resume.

Things certainly moved! Of course, the gaols were full; but a new cry had gone out for "sunlight in every cell," and so the gaols were big and bright with jazz music pouring out of every window, and with burglars telling the warden when to buy copper and when to drop nickel.

Buy! Soon you didn't need to buy! You just picked things up! One man—I knew him—picked up a quarter of a mine in Northern British Columbia for a song—, and he could sing better. Another picked up twenty shares in a pearl fishery in Switzerland; another man got for practically nothing, or less, forty thirty-fifths of an ice plant in Greenland. There was something coming to everybody, and everybody got what was coming to him.

All this made a great intellectual brightening. Talk became so interesting! Everybody else's mind seemed so bright, what with nickel and copper and Kansas hogs on the hoof, and Rhodesian cotton by the bale; and all going up! Every dinner party was a rattle of brilliant repartee made up of equal parts of arithmetic, geography, hogography and market biography; or of softer undertones, in whispered asides, such as "Hogs are up in Kansas, darling, by a cent and a half!" "Oh, Fred, isn't that lovely!" "Yes, sweetheart, and selected high quarters are up higher still. They touched 25 cents." "Oh, Fred, what a lot it will mean to mother!"

Of course, what was really happening was simply "inflation." We were all just being "inflated," and we didn't know it. The merry banker who shoved a hundred sovereigns across the counter, in that pleasant way he had, why he was just inflated, that was all. The kindly broker who gave us—practically gave us—the shares in the Andusinian Asbestos Abattoir, he was just inflated. The merry waiter who squirted the

champagne all over our shirt front and wouldn't charge for it—inflated. The jolly clergyman who ran the Mothers' and Children's lottery on the Abyssinia Sweepstake and cleaned up—you remember,—and cleaned up enough to send all the Home for Incurables to the seaside, and they never came back drowned or something, but it didn't matter. Well, of course, the whole thing was just inflation. The Government too. There was that terribly funny speech by the Chancellor of the Exchequer—nineteen twenty something, wasn't it?—in which he said that he was afraid there was going to be a surplus; and the House roared!

All the world in those big and bright days seemed infected with something. Scientists tell us that there is a gas that could do it, a thing called by the technical name of protoxide of nitrogen, but also known as "laughing gas." It was just as if we had each had a whiff of protoxide every hour or so, and were inflated with it. It is just possible, so the geologists say, that this gas lurks in the depths and crevices of the earth under our feet and at times filters through and infects us. So that was what was wrong. We were all full of gas. When the Prime Minister—I forget which one—made that splendid, buoyant, hopeful speech, ending with the words, "England! England!" and then fell backwards while the House rocked and cheered—well, he was just full of gas. The merry fellows on the golf links losing three-shilling balls on every other drive; the hilarious meetings of the shareholders, the gaiety of the Federated Charities' Tag Day: all of it just gas, merely inflation.

Too bad.

That was it. All the brightness; all the laughter and the merriment of the present; the fond hopes for the future; the fortunes that seemed assured; the old age so comfortably provided for: so that was all it was, just inflation! The bright new world iridescent with the sunlit colors of the soap bubble! To think that it had to go! Of course it had to go. It couldn't last. Sooner or later there was bound to come a wave of depression. That is always the fate of our humanity. It no sooner gets set in any one direction than a wave of something knocks it into another. It is like a tired swimmer staggering ashore in front of a rising tide.

So depression came; first here and then there and in little bits. Somebody staggered home from a lobster luncheon and lay down flat and murmured, "I'm depressed." People on tip-toe moved about him. "He's depressed," they whispered. Then more people and more; and so it spread. Depressed people won't travel; so it was soon announced that a wave of depression had hit the tourist business. So it kept spreading: the papers reported that copper was depressed, that rubber was sinking, that Kansas hogs on the hoof were feeling terrible. It reached economic social life; it appeared in little signs and notices: "Owing to the depression the miners will only mine just a little now and then." Or, "Owing to the

depression the anniversary of Christopher Columbus will not be observed."

For all of which there is, of course, only one remedy—Deflation. We have got to deflate. In fact, that is what we are doing now; we are being deflated. People look about them in this saddening world and wonder what is happening. What is this queer, strange feeling that is reaching all of us? This vague sense of discomfort and apprehension that never leaves us? Why has our bright world grown so dull—all the things that were bigger and brighter and that are growing smaller and dingier.

How changed the people are! Where is that merry banker who shovelled me over the sovereigns? Not this disobliging, discourteous dummy who tells me that my cheque is no good merely because there is no money in my account. Where is that merry fellow who used to drive the three-shilling golf ball into the water hazard and laugh at it? Where? There he is, on all fours, upside down in the rushes beside the pond looking for the six-penny ball that someone lost there last week.

All the world is getting like that. Michaelmas Jones, who rode in his thousand-guinea car and weighed 250 pounds without his cuff links, is now walking and weighs only 150 pounds. He's deflating. But, of course, what he weighs now is Troy weight; the fellow is a real Trojan.

Trojans all; but how dull they are. All they can talk of at dinner now is of the fall in copper, and the crash in rubber and the smash in wheat. Bright eyes grow dim with tears about the whispered rumor that bullock hides have fallen again. Old people sit with clasped hands, silent all evening because they know now that Siamese pig iron is unsaleable. They are sitting silent, deflating. Their married daughter, who was going to take a trip to the continent, is not going; she will stay home and deflate in Devonshire. The American tourists who were going to make a tour in Devonshire will stay at home and deflate in Kansas City.

How changed this bigger and brighter world.

But listen! If this process of deflation has got to go on, let's get at it and deflate in earnest and with good will. I'll confess, if you will, that I wasn't brought up to drive in a taxi; I'll confess, if you will, that till three years ago I never owned a single gold mine; I'll admit that it is not so long ago that I used to be afraid of a waiter, and could eat without a finger bowl; that I used to do such ridiculous things as turn off an electric bulb when I went out just to save light; that I only ate three meals a day and thought that *pate de foie gras* was the name of a French general.

We must all deflate. And the young people most of all. How ridiculous—in the inflated days; to call for a girl in a hired car to take her to a dance only three or four miles away! Let her walk. How insane to bring her a great bunch of hothouse roses! Let her twine a wild rose in her hair, the way our grandmother did; or go out with her to the meadows or the pasture

and find an early cowslip. We must have deflated courtship and deflated weddings, with a mournful best man, gloomy little deflated bridesmaids, and a clergyman with all the gas gone out of him

We must get down to it

After all, it won't last for ever. Things never do. Not for nothing did nature frame this universe in spinning circular orbits. Things come around again. Something is bound to happen. Perhaps someone will get up a war, a really destructive war, the only thing humanity seems to understand; one big enough to restore prosperity. Not right here, of course. But perhaps we could get Brazil—it's an ambitious country—to invade Mongolia. Then the sharp rise in coffee will start an upward movement in leather and a boom in copper and a gold rush to Patagonia, and there we are—spinning again and with the gas turned on full.

But, till then, let us take our deflation like men—shrinking, contracting, subtracting, condensing, getting smaller and denser and duller—but at least, men.

Company Booklets

Godfrey L. Cabot, Inc., 940 Old South Bldg., Boston, "More About Certified Black". A very interesting discussion of the improvements made in the quality of carbon black and a detailed explanation of the four principal specifications by which carbon black may best be judged.

Eastman Kodak, Rochester. December number of "Synthetic Organic Chemicals" describes alkylating agents.

Fisher Scientific Co., 711 Forbes St., Pittsburgh. Current issue, "The Laboratory" an interesting description of Leonardo da Vinci as a scientist rather than as an artist.

Grasselli Chemical, Cleveland. A new issue of Grasselli's Growers' Guide, describing proper use of insecticides and fungicides.

Hercules Powder, Wilmington, Del. Beautifully illustrated brochure describing the new Hercules Experiment Station and the important part the Hercules organization plays in research.

Hercules Powder, Wilmington, issued an additional chapter to the Hercules Nitrocellulose handbook on blending. Also revised pages, 1-6 are being substituted.

Paper Makers Chemical Corp., Kalamazoo, Hercules Powder subsidiary. A new leaflet listing chemicals manufactured and distributed by Paper Makers.

Roessler & Hasslacher, Empire State Bldg. Two new leaflets, one describing R. & H. non-inflammable solvents, and the other trichlorethylene.

Standard Silicate, Pittsburgh a new booklet describing Standard sodium metasilicate as a cleanser of many diversified uses.

Copies of the above may be secured directly or CHEMICAL MARKETS will be glad to forward requests.

Canadian production of acids, alkalies and salts during 1930 was valued at \$20,111,602, as compared with \$28,021,972 in 1929. There were seventeen plants engaged in the industry, with an aggregate capital of \$52,314,567, employing 3,409 persons, who received in salaries and wages \$3,502,834. Raw materials cost \$4,712,471. Eight different plants produced sulfuric acid. The output of 66 degrees Be sulfuric acid totalled 107,352 tons, of which 93,913 tons at \$1,138,441 were made for sale, and the remainder for further use in the makers' chemical plants.

We Congratulate--

Willard Henry Dow, January 4, 1897

August A. Wasserschied, January 11, 1871

Elvin H. Killheffer, January 16, 1884

Being the son and heir of a distinguished father is one of the most difficult careers open to a young American. In our democratic midst, primogeniture is

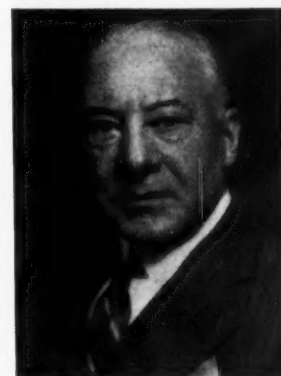
not only illegal, it is positively unpopular, and the successful successor of a successful sire must possess a rare combination of talents that embraces such contradictory characteristics as dignity and good fellowship, sound judgment and a sense of humor; a head for business, a heart for friendship, and the spirit of leadership. The rich man's son simply must succeed, or he is the most miserable of failures. And so to Willard Dow our congratulations. Even to his hobby of horticulture, he is

his father's son. Yet he stands on his own feet. The loyalty and hearty co-operation he has from the great organization he heads, is the most cordial second possible to our good wishes—and best guarantee of their fulfillment.

In 1893—that's within a year of forty years ago—H. T. Jarrett, manager of the New York office of the Mallinckrodt Chemical Works engaged as his assistant a quiet young man, a graduate of the N. Y. College of Pharmacy, who knew a joke when he heard one, but who methodically made it his business to master every detail of the intricate business of selling fine chemicals. In 1913—that's just twenty years after he tackled this job—that young man, grown up into a practical executive, succeeded to Mr. Jarrett's important post. Almost forty years with one big company, steadily growing in an important position, is reason enough for congratulations. Above that, we like August Wasserschied and we enjoy joining several thousand friends in wishing him happy birthday.

If Maurois, with his happy knack of choosing titles, were to write the biography of Elvin H. Killheffer the stout and interesting volume might very well be labelled "Ajax, or The Man Who Couldn't Retire." Ajax, you remember, was the stocky and courageous Greek warrior who defied the lightning—an analogy that is plain enough and apt enough to all of us who know the long, bitter, successful fight for American dyes which Dr. Killheffer fought. Many know too, his rare collection of stories,

both ancient and modern; but fewer of us know that his chief interest is floriculture. May he never retire! which is not a selfish, but a public spirited greeting.



The American Chemical Industry

Consolidates Its Position

ECONOMIC forces, as powerful, as relentless as an hydraulic press, have been squeezing the "wind and water" out of American chemical operations. The past two years have been difficult and the immediate future seems hardly easy, nevertheless this pressure has solidified the technical, the commercial, and particularly the financial foundations of the industry. In the main, chemical industry in the United States is in a more sound position; and provided the contracting process is not carried on to the point where it endangers resources or damages trained personnel, the curtailments and restrictions of the depression period may well prove to be, in the long run, a well disguised blessing.

The immediate, most obvious effect has been a sharp check to the merger movement. Secondly the continued prostration of general business has brought to our chemical executives a group of new problems—strained credits and freight rates—which are more or less beyond their control. Finally it promises to inject questions of taxes and tariffs and doles which are apt to be extremely disconcerting during the year ahead.

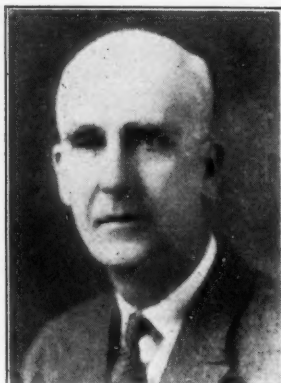
Already it is recognized that the halt called upon the frantic scramble to gather chemical enterprises of all and sundry sorts into any kind of a merger was

wholesome restraint upon a movement that had passed beyond the bounds of sound commercial or technical logic into the field of highly speculative finance. The strenuous efforts of the executives of several of these rather heterogeneous amalgamations to straighten out the lines of their organizations; to consolidate operating and selling activities; to put into real effect many of the economics always promised by consolidations; and generally to put their house in order shows how necessary this digestive process has been. Yet it is rather surprising to remember the number of important consolidations that have taken place during the past year of stress.

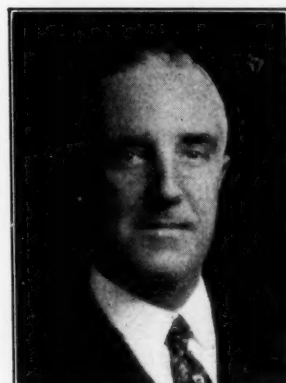
The du Ponts have bought out the Dunbar Molasses-Kentucky Alcohol interests previously associated with them in the large and modern fermentation plant at Deepwater, Delaware. This was a logical move, and the demoralization of the alcohol market doubtless presented an opportunity to secure favorable terms. Likewise, the taking over of the Newport line of dyes was an astute strengthening of their dyestuffs division. The alliance of their Krebs interests with the Commercial Pigments Company of the Commercial Solvents interests is apparently a step backwards from their recent policy of acquiring outright control of subsidiaries; but was probably



Dr. John E. Teeple
Jan. 4, 1871 - March 23, 1931



Dr. Richard B. Moore
May 6, 1871 - Jan. 21, 1931



Philip O. Schleussner
Sept. 6, 1878 - March 21, 1931

necessary under the circumstances. The du Ponts continue to evidence the liveliest interest in all that pertains to lacquers and ammonia and to push the development of their rayon and cellophane operations.

The carbon black industry has witnessed unusual activity. The Swann interests have taken over the pioneer firm of Wilkes, Martin & Wilkes; Columbian Carbon bought the old, important ink-making house of Frederick Levey; Wishnick-Tumpeer, comparative newcomers in this field, have been steadily extending their operations, notably by the purchase of the Union Gas Products Company, one of the more important of the Louisiana operators. In the plastics field, three leading companies working on the casein base, Erinoid Corporation (Borden interests), Karolith Corporation, and Panoplastics (Heyden interests) have combined to form the American Plastics Corporation. Hercules Powder has absorbed the Papermakers' Chemical Company, giving it a logical rosin outlet and furnishing its new subsidiary with the advantages of more complete selling organization. American Cyanamid has made, during 1931, but one important addition to their group, the purchase by their Calco subsidiary of National Ultramarine Company, a very important producer.

Considering the state of business the year's record of plant construction has been rather notable. The Solvay Process Company is currently reported to have spent some \$5,000,000 at Syracuse—of which \$1,000,000 was expended in doubling the capacity of the brine pipeline from Tully, New York—chiefly in expanding their soda ash operations. A brand new bichromate producer has recently come into production out in Ohio and the works of the Natural Products Refining Company at Jersey City, on the seaboard, have been materially expanded, reflecting the increased use of chrome colors and of chromium plating. An alkali production, rumored by some to be projected in terms of an enormous output, is planned for an entirely new territory, the Gulf Coast, where at Corpus Christi, Texas, 350 acres have been purchased by the Southern Alkali Company, backed by Cyanamid and Pittsburgh Plate Glass capital. The invest-

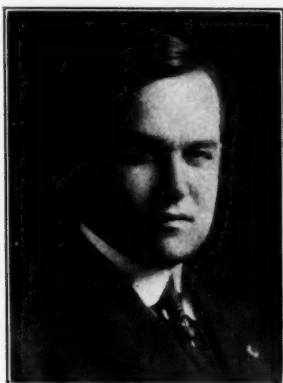
ment here, according to plans, will reach ten million dollars, recognition of the growing petroleum refining business of the Texas-Oklahoma fields and a forecast of industrial development in the Far South.

Up in New England, the rebuilding of the Everett plant of the Merrimac Chemical Company has been completed. Naturally they installed the sulfuric acid process of their ally, Monsanto, and with other improvements in their operations are said not only to have increased yields but also to have reduced costs on practically all of their heavy chemical operations. Those efficiencies are reported to have had a not unimportant part in the financial showing of the entire Monsanto operations, one of the few chemical enterprises to show increased net profits for 1931.

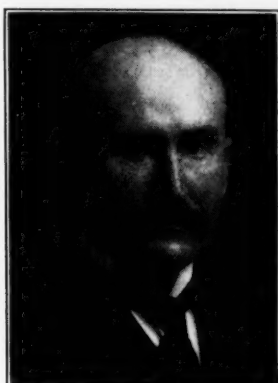
Expansion of the artificial silk industry, which has been rapid ever since the war, has been pulled up short; but in the closely allied field the Sylvania plant, producing cellophane, has been doubled in capacity this year and the Eastman interests have brought a new cellulose acetate plant into production at Kingsport, Tennessee.

The investment of the Freeport Texas Sulfur people in the Cuban American Manganese Company, has begun to show some returns this year, and it is understood that the operations will be extended to an annual capacity of 50,000 tons of manganese. Anticipating the growth of fertilizer consumption in the wheat country of the Northwest, American Agricultural Chemical Company has bought riverfront acreage at St. Paul, Minnesota and projects a plant which will be supplied with phosphate rock barged up the Mississippi from their Florida mines. Another foresighted plant investment is the building of Mallinckrodt at Toronto where their line of fine and medicinal chemicals is now being produced.

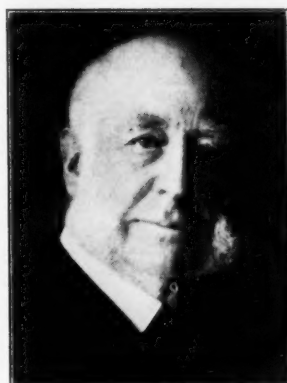
But possibly the most significant plant developments of the past year have been in the allied fields of borax and potash. Certainly the first shipment of potash from mines of the Southwestern Permian beds is a chemical event of real historical import. This took place late this summer from the mines of the United States Potash Company at Carlsbad, New Mexico.



Thomas R. Evans
Nov. 18, 1878 - March 17, 1931



William R. Peters
April 13, 1850 - March 17, 1931



E. T. Bedford
Feb. 19, 1849 - May 21, 1931

Work is being pushed to increase the output to 5,000 tons daily, and the British Borax Consolidated, have associated themselves with this enterprise, a wise and obvious counter to the combined borax-potash operations at Searles Lake where the American Potash &

for use in aqueous and alcoholic solutions; chloracetophenone from E. C. Klipstein & Sons Company; trichlorethylene, a likely solvent, from Roessler & Hasslacher; Tex-o-dors, a line of deodorants and perfumes for textiles from Givaudan-Delawanna;

PRICES OF FIFTEEN LEADING INDUSTRIAL CHEMICAL COMPANY'S COMMON STOCKS

<i>Common Stock</i>	<i>January 1</i>	<i>April 1</i>	<i>July 1</i>	<i>October 1</i>	<i>December 1</i>
Air Reduction Co.....	97	92 $\frac{3}{4}$	84 $\frac{7}{8}$	60	58
Allied Chemical & Dye Corp.....	175 $\frac{1}{4}$	142 $\frac{1}{8}$	128 $\frac{3}{4}$	79 $\frac{1}{2}$	75 $\frac{1}{2}$
Davidson Chemical Co.....	14 $\frac{7}{8}$	17 $\frac{1}{4}$	14 $\frac{1}{2}$	4 $\frac{1}{4}$	5
Anaconda Copper Co.....	30	33 $\frac{1}{4}$	28 $\frac{7}{8}$	15 $\frac{1}{8}$	13 $\frac{1}{2}$
Columbian Carbon Co.....	77	84	79 $\frac{1}{4}$	38 $\frac{3}{8}$	39 $\frac{1}{8}$
Commercial Solvents Corp.....	15 $\frac{1}{2}$	17 $\frac{3}{8}$	14 $\frac{1}{2}$	10 $\frac{5}{8}$	10 $\frac{1}{4}$
Corn Products, Refining Co.....	78	79 $\frac{7}{8}$	74	41 $\frac{7}{8}$	46 $\frac{1}{4}$
Devoe & Reynolds "A".....	11 $\frac{3}{4}$	17 $\frac{1}{8}$	14 $\frac{1}{4}$	11	10 $\frac{1}{2}$
du Pont Co.....	86 $\frac{3}{4}$	95	89 $\frac{1}{2}$	61 $\frac{1}{8}$	57 $\frac{1}{8}$
Liquid Carbonic Corp.....	41 $\frac{5}{8}$	43 $\frac{1}{2}$	31 $\frac{1}{2}$	16	19 $\frac{1}{2}$
Standard Oil Co. of New Jersey.....	47 $\frac{7}{8}$	41 $\frac{7}{8}$	38 $\frac{3}{4}$	29 $\frac{3}{4}$	30 $\frac{3}{4}$
United States Industrial Alcohol Co.....	64 $\frac{1}{2}$	43 $\frac{1}{8}$	30	22 $\frac{3}{4}$	31 $\frac{3}{8}$
Texas Gulf Sulphur Co.....	46 $\frac{1}{4}$	49 $\frac{3}{4}$	37 $\frac{5}{8}$	22 $\frac{1}{4}$	25 $\frac{1}{2}$
Union Carbide & Carbon Corp.....	57 $\frac{1}{8}$	63 $\frac{1}{4}$	52 $\frac{3}{4}$	30 $\frac{1}{4}$	33 $\frac{3}{4}$
American Cyanamid Co.....	7 $\frac{1}{4}$	9 $\frac{1}{4}$	8 $\frac{1}{4}$	4 $\frac{1}{8}$	4 $\frac{1}{8}$

Chemical Company operation has been the determining factor in the marked decrease in the price of borax during the past four years. Another rich mine has entered the borax field. The Western Borax Company is producing from an eight bore operation in Mojave Desert, where 2,000,000 tons are said to be in sight, with reserves of over 25 million tons. The new company is headed by P. H. Wooton, for twenty years the Brunner-Mond representative in Japan, who has entrusted sales to the agency of William S. Gray & Company. Still lower borax prices and the commercial demonstration of American potash mining are full of interesting chemical possibilities.

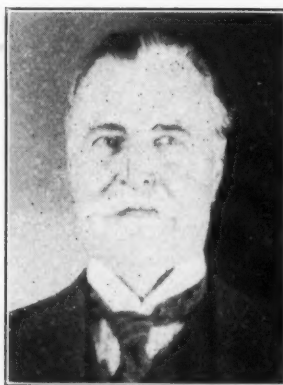
Along with these new chemical operations, 1931 has seen a remarkable number of new products reach the market. Synthetic butyl alcohol from Carbide & Carbon Chemical Corp., phthalyl chloride and pyrocatechol from Monsanto; ethylenediamine from Bersworth Laboratories; Ethox (lacquer plasticizer) from Van Schaack; a new line of synthetic resins known as Resinols from the Glyco Products Company who have also introduced Foramapin and Bead Oil synthetic foam makers (similar in action to saponin)

and a new inhibitor for metal pickling with Grasselli. With the exception of synthetic butanol, none of these newcomers to our markets appear to hold revolutionary possibilities, but they do show a tangible progress and are a pleasant proof that the chemical industry has not discontinued research and development work. As a matter of fact the reverse is the case and for both naval stores and nickel elaborate and expensive researches for new uses have been undertaken.

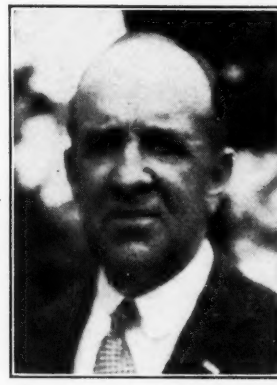
Two tangled patent situations have come to the fore during the past year. The synthetic rosin producers, represented by the General Electric, the du Pont, and the American Cyanamid companies, and the Ellis-Foster patentees, have reached a series of mutual agreements so that all may proceed with the research and production relieved of the danger of a long series of suits and claims likely to arise out of the confused patent rights of the group. In the lacquer field the outcome of du Pont's effort to remove similar possibilities of patent litigation and at the same time stabilize the market, by licensing to all



Dr. S. W. Parr
Jan. 21, 1857 - May 17, 1931



C. Harold Smith
Jan. 19, 1860 - Aug. 31, 1931



George M. Eno
Sept. 17, 1873 - Oct. 11, 1931

other lacquer makers what they claim are their basic rights, has not been so successful. The ability to stop costly patent litigation by agreements of this type and the implications of price control possible in these arrangements are extremely interesting.

the famous—to some it seems “the infamous”—in-difference of our leading chemical industrialists to foreign markets, the present situation is anomalous; and the marked increase is our foreign purchases of pyrites; the steady decline in our naval stores ship-

PRICE RANGE OF TWENTY REPRESENTATIVE INDUSTRIAL CHEMICALS

Commodity	January 1	April 1	July 1	October 1	December 8
Acid, acetic, 28%.....	\$2.60 100 lb.	\$ 2.60	\$ 2.60	\$ 2.40	\$ 2.40
Acid, sulfuric, 66% tank car.....	15.00 ton	15.00	15.00	15.00	15.00
Ammonia, anhydrous, cylinders.....	.15¼ lb.	.15¼	.15¼	.15¼	.15¼
Caustic soda, flake.....	nominal 100 lb.	2.90	2.90	2.90	2.90
Copper sulfate, carlots, bbls.....	4.00 100 lb.	4.25	3.60	3.40	3.10
Chlorine, tank cars.....	1.75 100 lb.	1.75	1.75	1.75	1.75
Sodium bichromate contracts.....	.07 lb.	.07	.07	.07	.06½*
Betanaphthol.....	.22 lb.	.22	.22	.22	.22
Phenol, carlots.....	.14¼ lb.	.14¼	.14¼	.14¼	.14¼
Formaldehyde, carlots.....	.06 lb.	.06	.06	.06	.06
Alcohol, C. D. No. 5, tankcar.....	.37 gal.	.24	.24	.25	.25*
Carbon tetrachloride, carlots.....	.06¼ lb.	.06¼	.06¼	.06¼	.06¼
Methanol, synthetic, tankcar.....	.40½ gal.	.40½	.35½	.35½	.35½
Ethyl acetate, tank cars.....	.088 lb.	.08	.08	.06½	.06½*
Lithophone, carlots.....	.04½ lb.	.04½	.04½	.04½	.04½
Red lead, carlots.....	.07½ lb.	.07½	.07½	.07½	.07½*
Zinc oxide, carlots.....	.06½ lb.	.06½	.60½	.06½	.06½
Sodium nitrate, crude, bags.....	2.02 100 lb.	2.07	2.05	1.73½	1.73½
Tri-sodium phosphate, carlots, bbls.....	3.25 100 lb.	3.15	3.00	3.00	3.00
Caustic Potash, solid, carlots.....	.06¼ lb.	.06¼	.06¼	.06¼	.06¼

*See page 74 for changes.

Two other developments of broad economic significance have attracted the attention of the industry's leaders. The plight of the railroads, whose rates and labor charges are both virtually fixed by factors beyond their control, is a threat not only to the transportation system which is still the chief reliance of the chemical makers, but also to a vast army of savings banks, insurance companies, trustees and others who have come to regard railway bonds as securities representing the maximum of security. The roads are moreover, sorely beset by competition from motor transport lines, yet the interstate Commerce Commission was undoubtedly correct in their refusal of a general increase, of 15% in all freight rates. This is undoubtedly one of the very serious, unsolved problems of the day, and one that closely affects chemical interests.

Growth of Our Export Business

For the first time, except under the abnormal demands of the war period, our chemical exports exceeded our chemical imports. The trend has long been in this direction and since the war it has been more marked, but our economists are puzzling whether a favorable chemical balance of foreign trade is a temporary or a permanent phenomenon. The sharp falling off in the import of all sorts of raw chemical materials is easy enough to comprehend. Some of these declines, as in varnish gums, camphor, essential oils, etc. would appear to be permanent. On the other side of the trade ledger, the greatest growth proportionally has been the exportation of alkalies and other industrial chemicals, with toilet preparations showing up well above the average. In view of

ments; and uncertain future of our phosphate rock exports are factors that call forth conflicting opinions.

By and large our chemical industry has continued to demonstrate strength. In comparison with other American industries it maintains its more prosperous condition. This is demonstrated by the income tax returns and by the published financial statements. But the most encouraging sign for the immediate future is the strength of the less-than-carload market and the readiness with which the larger industrial consumers have signed their contracts, covering their chemical requirements for 1932 at current prices and in quantities that are generally somewhat in excess of their last year's commitments.

Comparison of Ammonia Prices

Editor, CHEMICAL MARKETS:

On page 357 of your October issue, there appears a discussion of chemical prices, comparing pre-war and present price levels. Regarding anhydrous ammonia, I note that the prices refer only to ammonia in cylinders, at present selling at approximately 15 cents per lb. as against 25 cents per lb. in 1914. I think it only fair to point out in any comparison of this sort that for five years anhydrous ammonia has been available in tank car lots at prices around 5½ cents per lb. This low price is due not only to technical developments in ammonia manufacture, but also to the technical development of suitable tank cars. I would point out that rarely does the development of a new shipping container allow a reduction in price of 10 cents per lb., or, stated in terms of percentage, a reduction of 65% in selling price. Figured on a basis of 5½ cents per lb., the 1931 anhydrous ammonia price is 78% below the 1914 price, which, you will note, is the largest percentage reduction of any commodity included in your list of comparisons.

Chapin Tyler.

Chemical Industry In England

Overshadowed by Political Events

By M. D. Curwen

Editor, Industrial Chemist (London)

THE past year has been an extremely disappointing one especially in view of the fact that 1930 was by no means a prosperous year. Decrease in production and in trade were noted in almost all branches of the industry. The most important events have not been chemical but political and it is noteworthy to what extent politics have been discussed in scientific and technical journals. The hubbub that arose early in the year over the imposition of a tax on turpentine and petrol as being a terrible weight on the synthetic camphor and many other chemical industries died down rapidly on learning of the Supplementary Budget in September. The attempt to balance an adverse budget was courageously supported throughout the country after a National Government had been formed of the different parties. The world then began to feel the force of the economic blizzard. Great Britain came off the Gold Standard and the fall in value of sterling began. In an attempt to balance our trades and to prevent dumping the Government has now introduced a series (three in number to date) of Orders under the Abnormal Importations (Customs Duties) Act. By these orders high duties (50% ad valorem) are placed on the imports of many articles such as sanitary earthenware, glazed tiles, domestic glassware, metal furni-

ture, cutlery, tools, certain woollen and cotton goods, stockings, linoleum, cycle tires, clothing, candles, battery carbons, citric and tartaric acid, aluminum sulfate and alums, ammonium chloride and lithopone. It will be realized that the chemical industry will benefit both directly and indirectly from these measures. One effect is that there have been numerous enquiries from abroad as to the possibilities of manufacturing many commodities here. The whole industry anticipated a brisk trade revival and during October and November the demand for chemicals improved. At the time of writing (middle December) conditions are very uncertain again. Expectations of

a revival of trade by the imposition of such duties are also being furthered by a very strong "Buy British" campaign which already has had a great effect, the ordinary buying public as a whole dis-regarding foreign made goods which may be cheaper.

Throughout the year chemical trade has been in a curious condition. Naturally enough all chemical business decreased severely but by no means in comparison with the basic industries. Some branches did badly while others did quite satisfactorily. As will be seen from the accompanying figures (Trade and Navigation Accounts), the worst offenders in the export trade are ammonium sulfate and coal tar

EXPORTS FOR 11 MONTHS ENDING NOVEMBER 30

Value in Pounds Sterling			
Commodity	1930	1931	Increase or Decrease
Sulfuric Acid	38,900	22,200	— 16,700
Tartaric Acid	82,700	49,200	— 33,500
Ammonium Sulfate	4,179,800	2,376,100	—1,803,700
Bleaching Powder	174,200	121,600	— 52,600
Coal Tar Products	1,091,200	565,500	— 525,700
Copper Sulfate	894,600	676,500	— 218,100
Disinfectants	832,200	761,800	— 70,400
Glycerine	277,300	213,600	— 63,700
Potassium Compounds	177,800	154,100	— 23,700
Sodium Compounds	3,027,500	2,633,200	— 394,300
Dyes	909,000	1,008,000	+ 99,000
Paints, etc.	3,025,200	2,193,700	— 831,500
Drugs, Medicines	2,612,100	2,449,200	— 162,900
Total	20,447,200	15,720,800	—4,726,400

IMPORTS FOR 11 MONTHS ENDING NOVEMBER 30

Value in Pounds Sterling			
Commodity	1930	1931	Increase or Decrease
Acetic Acid and Anhydride	360,000	314,300	— 45,700
Tartaric Acid	189,800	227,500	+ 37,700
Borax	122,900	119,700	— 3,200
Carbide	481,500	504,100	+ 22,600
Red Lead	80,800	48,100	— 32,700
Potassium Compounds	1,039,800	1,123,100	+ 83,300
Sodium Compounds	614,200	912,600	+ 298,400
Finished Dyestuffs	1,020,600	1,139,400	+ 118,800
Extracts for Dyeing	161,400	145,000	— 16,400
Extracts for Tanning	1,007,600	888,700	— 118,900
Drugs, Medicines, etc.	1,938,800	1,712,500	— 226,300
Paints, etc.	1,534,100	1,495,200	— 38,900
Total	12,430,900	12,657,000	+ 227,100

products. From a consideration of the weight/value exports of sulfuric acid between 1930 and 1931 it would appear that a great portion in 1931 consisted of high-priced purer acid. The exports of this material, however, have never been very large. Exports of ammonium sulfate diminished for the usual reason of world depression and also, probably, to the agreement of reduced production. With regard to coal tar products the decline mainly due to creosote oils has now been of long duration and one hopes that the British Wood Preserving Association will be able to find new outlets for these materials. It was hoped that creosote oils would find employment in the manufacture of carburetted water gas, but considerable research on the subject in this country has led to the disappointing result that creosote is not suitable. As a wood preserving material it continued to receive competition from new impregnating materials such as mixtures of zinc arsenate, fluorides, and salts of nitrophenols, and from the use of steel in replacing wood entirely. Compared with 1930, there has been a drop in chemical exports of nearly 35% while there has been a small increase in imports. Such figures show the really serious condition of affairs in this country, how close import and export figures have approached one another, and the need for a system to create a better balance of trade.

Drop in Export Figures

The reduction in exports of this chemical continues its decline taken for several years, due to foreign competition, and the diminishing quantities used in the chemical industry itself. Nevertheless production, according to authoritative sources, remains about the same being approximately 67% to 71% of the total capacity available, this figure having varied from 67% in 1928 to 71% in 1929 and 68.3% in 1930.

The main feature of the sulfuric acid industry is the attention which has been paid by the blende roasters to the sintering of blende on Dwight-Lloyd machines and the utilization of the gases thus produced for the

manufacture of acid. The blende roasters are competing very favourably with the "straight" producers of acid from pyrites, etc.

There has been steady progress in the use of vanadium catalysts for sulfuric acid production, using a siliceous or silica gel base. This development has taken place in spite of the relatively low price of platinum.

Sulfur Imports Decline

As a raw material, sulfur is only used to the extent of approximately 15%, as contrasted 24.6% in 1927, while zinc blende as a raw material has gone up to approximately 10%. Spent oxide forms about 25% of the raw material used, and pyrites about 49%.

Several new Mills-Packard chambers and the new plant with four Gaillard-Parrish chambers designed for liquid-phase conditions erected in 1930 are working satisfactorily. With regard to chamber sets it is interesting to note that the nitre-pot is being steadily replaced by plant for the production of nitric acid by the oxidation of ammonia and that about 50% of the plants in the country are so equipped.

As reported last year, the replacement of hydrochloric acid for "pickling" by sulfuric acid is continuing and of similar interest to the sulfuric acid industry is the announcement of the reconstruction of the Mond Nickel Company's copper sulfate factory at Clydach, with a capacity of 50,000 tons per annum.

The new extensions to the Acton (London) Precious Metals Refinery of the Mond Nickel Co. were opened in April of this year. It is surprising to learn that of the 400,000 ozs. of platinum consumed by the world approximately 300,000 will be produced at this works from Canadian nickel-copper ores. Among other precious metals produced are palladium, rhodium, ruthenium and iridium.

British Industrial Solvents Ltd. which we noted last year as the first producers of glacial acetic acid in this country, at their excellently constructed factory at Hull have widened their products considerably and



British Industrial Solvents' plant at Hull has been enlarged and a wide range of solvents added in addition to the production of glacial acetic acid



Airplane view of the new platinum refinery at Acton, largest in the world and owned by the Mond Nickel Co. The opening on April 4th by Lord Weir attracted many distinguished visitors including Lord Melchett, Mr. J. H. Thomas and others

now produce a very wide range of solvents which include acetone, acetaldehyde, amyl alcohol, amyl acetate, butanol, butyl acetate, dibutyl phthalate, ethyl lactate, dibutyl tartrate, etc.

The recently erected extensions of electrolyte soda and chlorine plants of I. C. I. and Staveley Coal & Iron, continue to do well. The latter company also constructed a very modern liquid chlorine plant.

I. C. I. Activities Expand

The I. C. I. are now working a "dry-ice" (solid CO_2) plant; are also reported to be experimenting successfully with the employment of ammonia for welding purposes, and a special "cracking" plant for the production of hydrogen from ammonia. With regard to welding it is of interest to note that the transport of liquid oxygen in bulk was introduced early this year, in the Sheffield district. The quantity conveyed is equivalent to about 88,000 cu. ft. of gas; transported

in the usual cylinders such a quantity would need nine five-ton wagons.

A note was included in last year's summary of the construction of the New Ford motor works at Dagenham, Essex. The works with the exception we believe of the blast furnace are now in full swing and are producing motor-cars at some amazingly high rate.

A lot of unnecessary "boosting" of the food canning industry, has appeared in the daily papers. The industry is by no means new, but its increase has certainly given a fillip to the tin-plate industry, and to a section of agriculture. The writer has been privileged to see the most recent of the factories this year which although not a "chemical works," has been constructed with a thorough understanding of the application of chemistry to crop control and to this industry in general. We allude to the Huntington factory of Chivers & Sons Ltd. which began work in 1931 and now cans, potatoes, peas, asparagus, tomatoes and other foodstuffs.

A New Activated Carbon

This year has seen the introduction of a new type of activated carbon and solvent recovery plant in competition with the products of the well-known Carbo Union. This is the "Acticarbene" process which has been installed in three works and is stated to be operating satisfactorily.

There have been no outstanding events in the dyestuffs industry but progress has been rapid nevertheless. The Dyestuffs Act has been extended to December 31, 1932, and the general position may be regarded as very favourable, especially when we compare our production with pre-war days and with the production of other countries. More than fifty colours not manufactured hitherto in this country were marketed,



The completion in 1931 of the Acton Plant was one of the major occurrences of the year. Above, a battery of melting furnaces

the most important being Duratol Green G salt which enables the dyer for the first time to produce a green by the ice-colour process, several Duranol colours for Acetate artificial silk, some direct cotton colours and lakes of great fastness to light. Most of the improvements have been made by Imperial Chemical Industries Ltd. which has been further extended by the inclusion of the British Alizarine Co.

Further Production Additions

There has also been a commendable effort on the part of Imperial Chemical Industries to satisfy the demand of the textile industry in regard to materials other than dyestuffs. As a result wetting agents, emulsifiers and special textile oils have been manufactured and placed on the market. There has also been activity in the manufacture of synthetic resins for the electrical industry and accelerators and deoxidants for the rubber industry.

Perhaps the most noteworthy accomplishment in the field of fine chemicals has been the isolation of Vitamin D in crystal form. Much of the work has been done by Dr. Bourdillon and his co-workers at the National Institute for Medical Research in London. The crystals are now being manufactured by British Drug Houses Ltd.

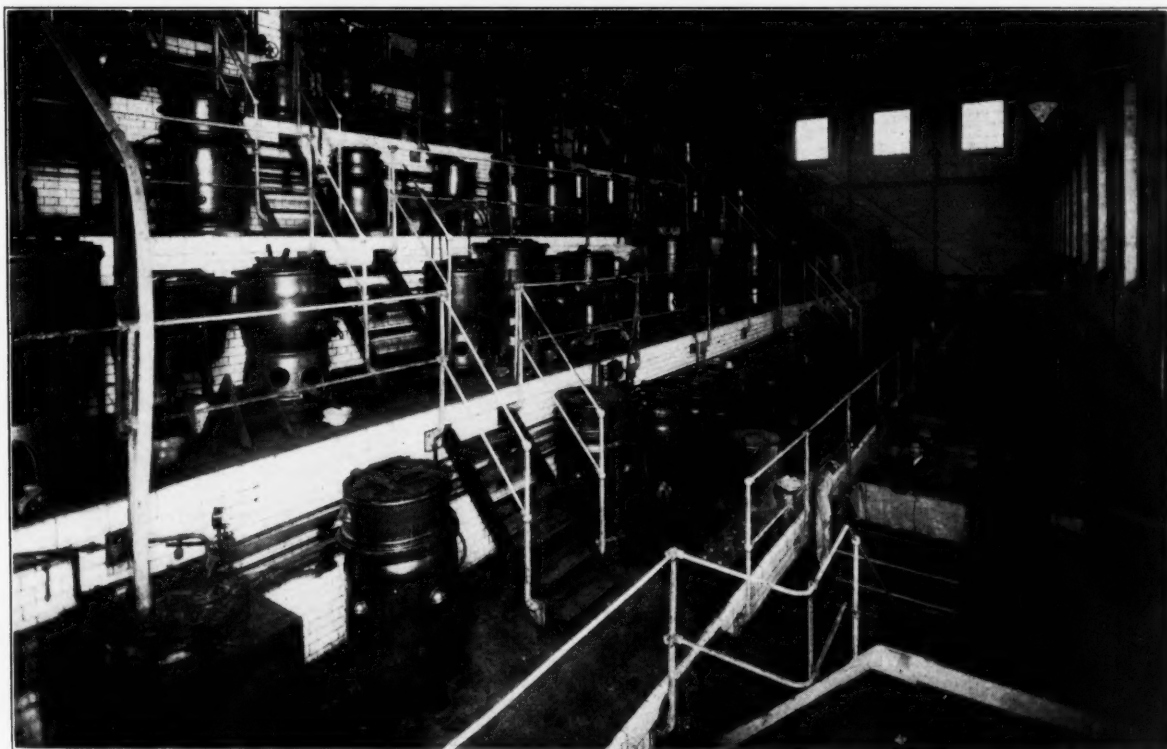
The most intense interest has been taken in the problem of obtaining oil from coal in an attempt to replace foreign imported material by British made oils. The center of discussion is of course Imperial Chemical Industries Ltd. who have done much excellent spade work on a 15 ton a day plant. The final result as



One of the processes of baking platinum, which is about to be placed into the oven

announced is that British coal can be hydrogenated to produce satisfactory liquid products and that depending on the price of coal (or tar if this is hydrogenated) petrol can be made at 7d. per gallon. Schemes have been prepared for a plant to produce more than 200,000 tons of petrol per annum which would need a capital outlay of £8,000,000. The latest information we have is that Imperial Chemical Industries do not intend embarking upon the project themselves although they would give all the help of their past researches and experience. The situation is still not at all clear and little information has been received in scientific circles.

Low temperature carbonization has not been discussed as heatedly as in previous years, but two new



The wet process building. The Acton plant now has a capacity of 3,000,000 ounces of platinum and associated metals annually. A description of the wet process was given in the December number

plants have been erected and working namely the Babcock-Wilcox plant at Dunston, a 60 ton retort which can be multiplied easily to form larger units, and the Davidson Rotary Carbonizing system at Colchester which is working on Estonian shale, and on blends of coking and non-coking coal.

Developments in Rayon



Lord Melchett
has proven a valuable help
to Sir Harry McGowan

Among the silk companies a number of reconstructions and amalgamations are taking place and others have been projected. Production has commenced at the new works of British Bemberg Ltd. at Doncaster, a skeleton staff for which was trained at the German Works of the parent company. The dividend paid by Courtaulds Ltd. was 6% as against 10% last year, the profits having fallen by £1,500,000. No profits were made from operations in England during the year. Certain companies such as Harbens Ltd. and Kirklees Ltd. made profits which must be considered good under the difficult circumstances. British Celanese on the other hand showed a net trading loss for the year of £275,000.

In these industries the process of elimination of the unfit which was referred to last year has continued. The newer firms have, for the most part, made considerable losses and a number have been shut down. At least two important artificial silk works have been sold up in the course of the year, and a large safety glass works is being sold early in January.

The best showing in the safety glass industry is made by Triplex Ltd. whose profit increased by £5,000 to £47,000. All motor vehicles licensed after January 1st. 1932 must be fitted with safety glass so that the opportunities for this trade are very favourable. In our review last year we mentioned that suitable celluloid for the industry was being made in this country. An official announcement to the effect that Imperial Chemical Industries, The British Xylonite Co. and The Triplex Co. had together been responsible for this work has just been made. Glass toughened by annealing is appearing on the market (made by Pilkington's Ltd.) and it is not improbable that in the course of time a product of this nature will displace laminated glass.

Loss of Professor Hinchley

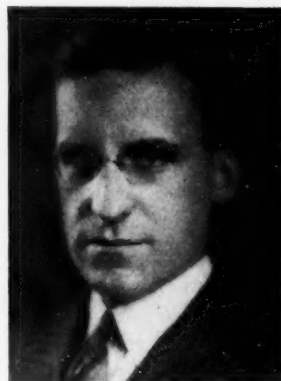
Chemical engineering societies throughout the world will have heard with regret of the death this year of Professor J. W. Hinchley who was such a prominent figure in this country in matters of chem-

ical engineering education. Furthermore, there are many industrial firms who will miss his aid as a consultant.

The new Ramsay Laboratory of Chemical Engineering has just been opened by Prince George, and is the only building built specifically for the purpose in the country. The industrial laboratory itself is unique in many ways and is already fitted with much large scale plant on a floor especially designed for the purpose.

Too Much Singing?

At but one Washington dinner in the year is the President of the United States granted the opportunity of saying what he



Pres. Ira Vandewater
will wield a stout gavel

pleases before Washington newspaper correspondents without fear of being misquoted the following day. Reason—no reports are printed of what is said or done. With a somewhat similar feeling of charity and an earnest desire to let the veil fall with as little comment as possible, CHEMICAL MARKETS rests content with merely stating for the record that the Christmas Party of the Chemical Salesmen's Association was held on the evening of Dec. 29, at the Park Central to the evident satisfaction of 150 enthusiastic members and guests.

With no opposition the names of those suggested by the Nominating Committee to guide the organization through 1932 were duly voted upon and elected Dec. 22. The new officers are: President, Ira Vandewater, R. W. Greeff & Co.; first vice-president, R. J. Grant, Noil Chemical & Color; 2nd vice-president, Louis Neuberg, Warner Chemical; 3rd vice-president, W. I. Galliher, Columbia Alkali; secretary-treasurer, Frank Byrne, Monsanto; Members executive committee, L. E. Swenson, American Cyanamid, and B. J. Gogarty, Rossville Commercial Alcohol.

Creosote Industry Growth

Increasing production of creosote oil in United States contributes constantly larger proportion of advancing domestic consumption. Trend, making itself fully evident in 1928, was fully realized in 1929 and apparently is prevailing through the year 1930—if the smaller imports this year may be taken as a sufficient criterion, according to survey of this industry by J. N. Taylor and R. G. Boyd of the chemical division, Department of Commerce. As result of large installations for recovery of "dead" (creosote) oil from tar that formerly would have been consumed as fuel, there was 25 per cent quantity advance in United States 1929 production (167,685,000 gallons, valued at \$19,317,000).

Chemical Construction

North Bergen Varnish, North Bergen, N. J., is planning plant addition.

Dooner & Smith, Newark, N. J., a warehouse. New building will have 15,000 sq. feet of floor space.

St. Joseph Lead has almost completed installation of machinery at Boise-Rochester mine, Atlanta, Idaho.

Charles Pfizer, plans addition to Brooklyn factory.

Continental Chemical, Tahoka, Tex., plans erection of several buildings.



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CHEMICAL

Photographic Record

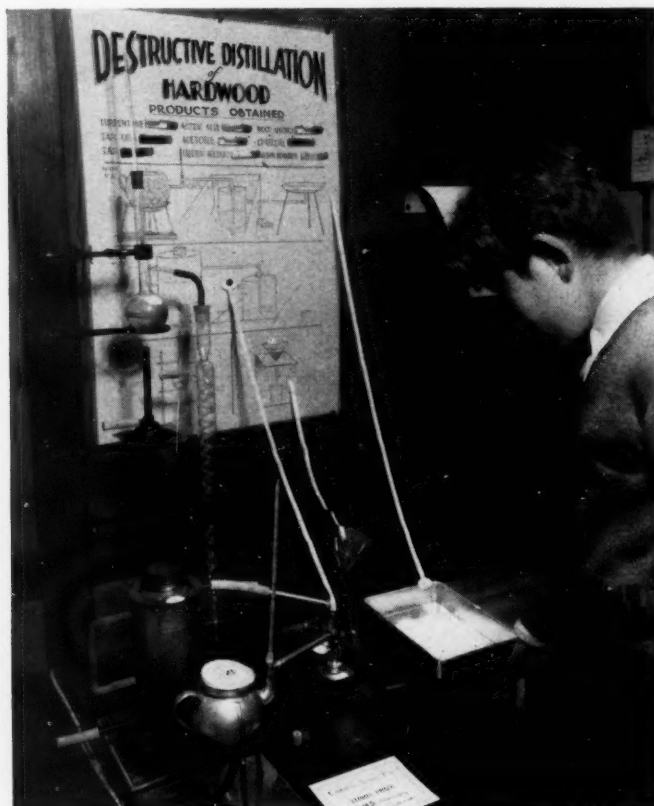


Keystone

Employees of Abbott Laboratories, Chicago, honor Dr. Alfred S. Burdick, president of the Company, in an unusual manner on occasion of the 10th anniversary as head of the organization

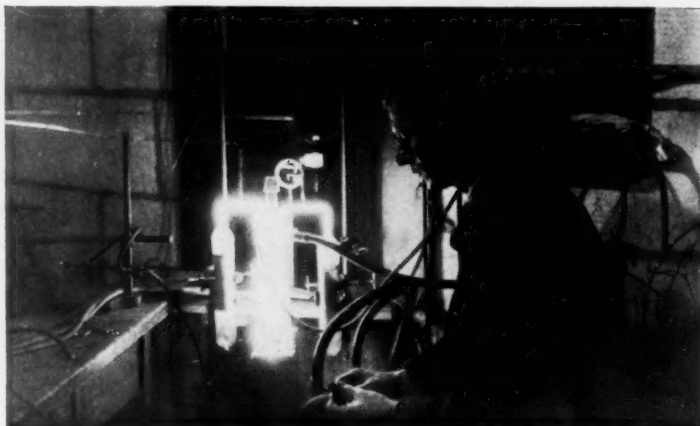


A piece of sculpture work which is shortly to be erected on the new Imperial Chemical Building at Grosvenor Road, representing "Chemistry." It depicts the chemist opening the hand of Mother Earth and finding hidden chemicals within the palm, it is one of the four groups representing Chemistry, Agriculture, Marine Transport and Modern Building, all being the work of Mr. C. S. Jagger



Upon the shoulders of the rising generation falls a great task: Harry Silverman, Morris High School (N. Y. City) student, age 17, wins third prize at the recent Children's Science Fair, held at Museum of Natural History and directed by L. W. Hutchins of the Swann Corp.

Dr. F. G. Brickwedde, U. S. Bureau of Standards, photographed beside the big flask holding liquid hydrogen at 437 degrees below zero Fahrenheit. The new gas, twice as heavy as ordinary hydrogen, was discovered by Dr. Brickwedde, and Drs. Harold C. Urey and G. M. Murphy of Columbia. Whether the new hydrogen can be produced commercially and what its uses might be is still uncertain

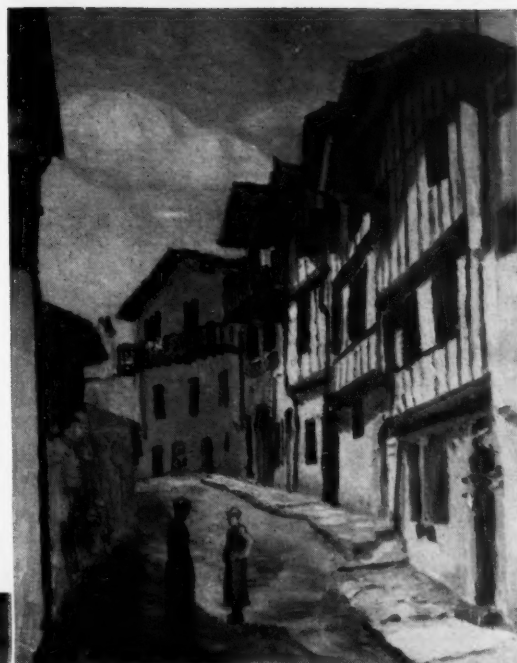


Underwood & Underwood

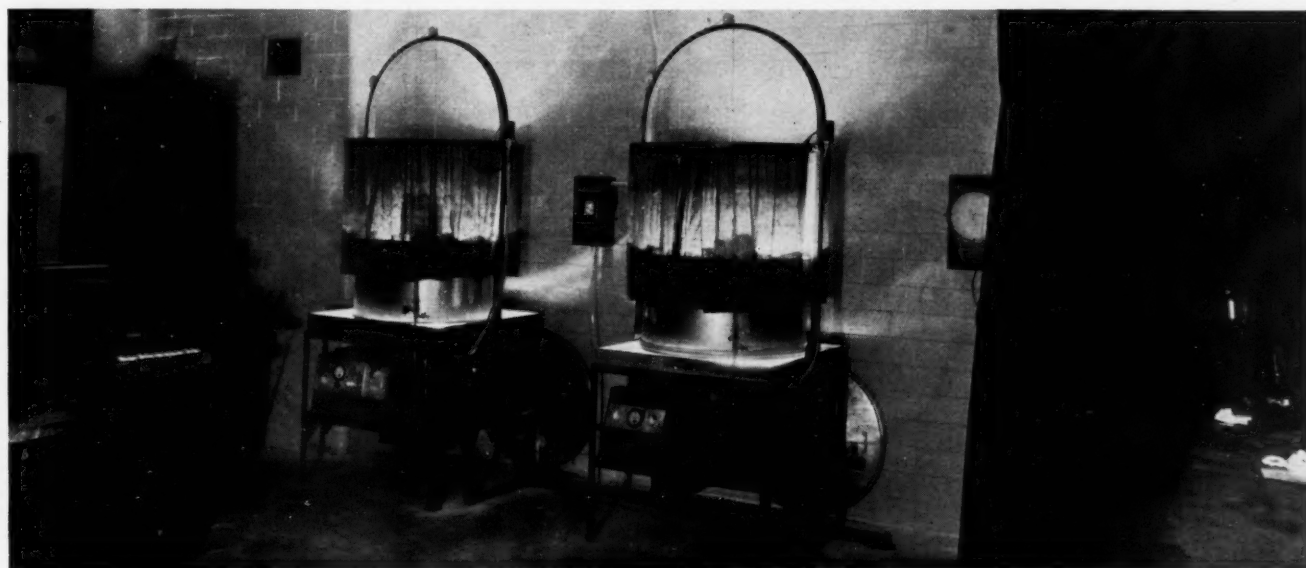
L NEWS REEL

rd of Chemical Activities

A prominent chemical industrialist turns to art in his leisure moments. E. M. Sergeant who was for many years engaged in chemical trade as president, E. M. Sergeant Co., exhibits several paintings at the Perargil Galleries in N. Y. City. Right, Rue de l'échelle, Ciboure, France, and below, Avec au gascone, Gaspe



Two striking photographs of the new Hercules Experiment Station located near Wilmington. The Station consists of a group of buildings, the central structure being a main laboratory building which is served by a group of semi-plant units, shops and smaller laboratories. Below, accelerated weathering machines to test finish formulas. In laying the cornerstone of the new Experiment Station, President Dunham said, "In the opportunities for growth and sound development that lie ahead, I am confident that this new Hercules research station will play an important part, so I lay this cornerstone with the thought that in these surroundings Hercules men and women in the years to come may find a common rallying place where useful things can be done for the benefit of our company and the world at large"



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TOLUIDINES
NITROTOLUENES
PARANITRANILINE
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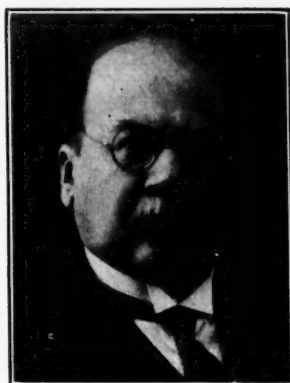
Chemical Germany Carries On Under Depressing Conditions

IT IS not necessary to characterize the past year in detail. Everyone,—whether scientist or industrialist, whether independent or employee, manufacturer or dealer, exporter or representative—feels the pressure of the times which, since July 1931, has rested very heavily on Germany. Everywhere one meets with retrenchment, measures of economy, and provisions against distress which make free operating, thinking, and acting difficult. The year 1931 is, it is true, closing with a very significant export surplus, amounting to almost three billion Reichsmarks 3,000,-000,000 RM.)

All signs however, indicate that German exports will soon show considerable recession as a result of the further downward course of the market in purchasing countries because of changes in the monetary systems, because of the prohibition of imports and import duties, and because of the limitation of imports. In the chemical industry, which as we know, is dependent upon the exportation of its products, and which thus far, has stood up comparatively well, constantly poorer times are being looked forward to.

At a meeting of the Directorate of the I. G. Farbenindustrie A.-G. on November 21, 1930, it was stated that a diminished income must be expected. Even though the sales in the fields of dyes, pharmaceutical

Photograph is the most recent airplane view of the Leuna Works.



*Dr. Walter Roth
Editor
Chemiker Zeitung*

products, photographic products, and in part, also of chemicals, have been maintained, nevertheless, conditions are unfavorable in nitrogen, gasoline, and rayon. These are the industries which have, during recent years, been built up in such an admirable manner. Conditions prevailing in the nitrogen market are known. The domestic German market is, on the one hand, suffering from the poverty of the farmer, and on the other hand, great unsettlement has developed in the world nitrogen market by the failure of the international nitrogen negotiations. New nitrogen plants continue to be built. Prohibitions against im-

portations and import duties on fertilizers are everywhere being promulgated. Because of the intense battle in the petroleum field, the gasoline industry is not showing any profit at the present time. Unfortunately it is in the production of gasoline that great progress was made at the Leuna Works during the past year.

At present, mainly lignite tar and German petroleum from Thwinga, etc., are being worked up in admixture to produce gasoline. With the aid of a new type of catalyst,—which is now being supplied to the United States by the I. G. Farbenindustrie—it was possible to increase the capacity, originally calculated at 100,000 metric tons of gasoline per year to 350,000



Recent intimate views of the Leuna Works. Above, contact furnace and high pressure chambers

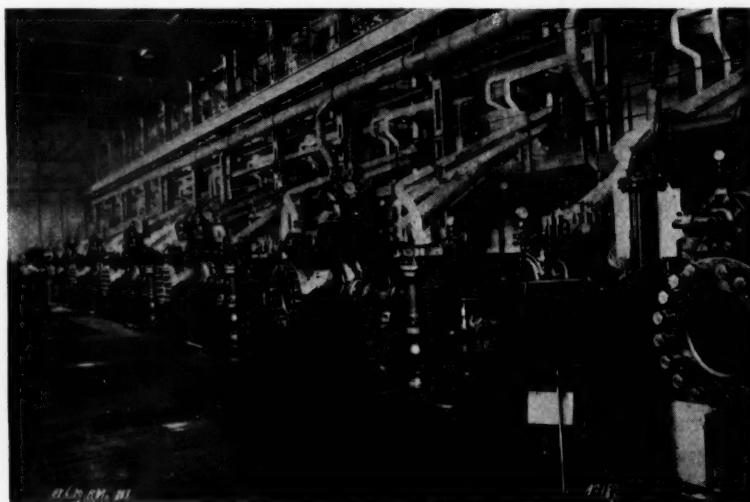
metric tons without any material investment. The so-called hydrogenation process is divided into two stages:

1. The recovery of middle oils from heavy oils or coal, or tar, in the liquid phase (sump phase) and
2. Cracking of the middle oils in the gas phase.

The mode of operation briefly, is that the tar or the petroleum is first resolved by distillation into gasoline, middle oil, and heavy oil. The heavy oil is put under a pressure of about 200 atm. and is mixed with hydrogen, also at 200 atm. The mixture is then heated in heat-exchangers by the heat of the outgoing products, and is then raised in heated pipes to the reaction temperature, whereupon it enters the reaction oven. By hydrogenation in the presence of a catalyst there are mainly produced in the sump-oven middle hydrocarbons, which in vapor form pass, with the unconsumed hydrogen, into the heat-exchangers, where they are cooled by the incoming mixture. The vapors are condensed in the annexed condenser. The condenser is followed by a separator in which the liquid hydrocarbons are separated from the hydrogen and small amounts of uncondensable hydro-

carbons. The liquid products pass to the still where they are resolved into heavy oil, middle oil, and gasoline. The heavy oil is passed back into the sump-oven, the middle oil passes to the second step of the process into the gasoline oven, and the gasoline passes to the refinery. The middle oil, whose boiling limits correspond about to a gas oil, is raised, by means of a pressure-pump to a pressure of 200 atm., and is then mixed with hydrogen as in the first stage. The mixture flows through the heat exchangers,—in which the middle oil is completely vaporized—into the reaction oven which is filled with the catalyst. Here, under the action of the catalyst, the further splitting and addition of hydrogen takes place in the gas phase. The reaction products pass from the gasoline oven through the heat-exchangers and the condenser into the liquid separator, where the gas is separated from the condensed liquid. The liquid portions pass to the still. The liquid product consists generally of about 60 per cent gasoline, while the remainder has not been converted and is therefore separated in the still and is returned to the gas phase. The gasoline, after going through a washing process, is ready for sale.

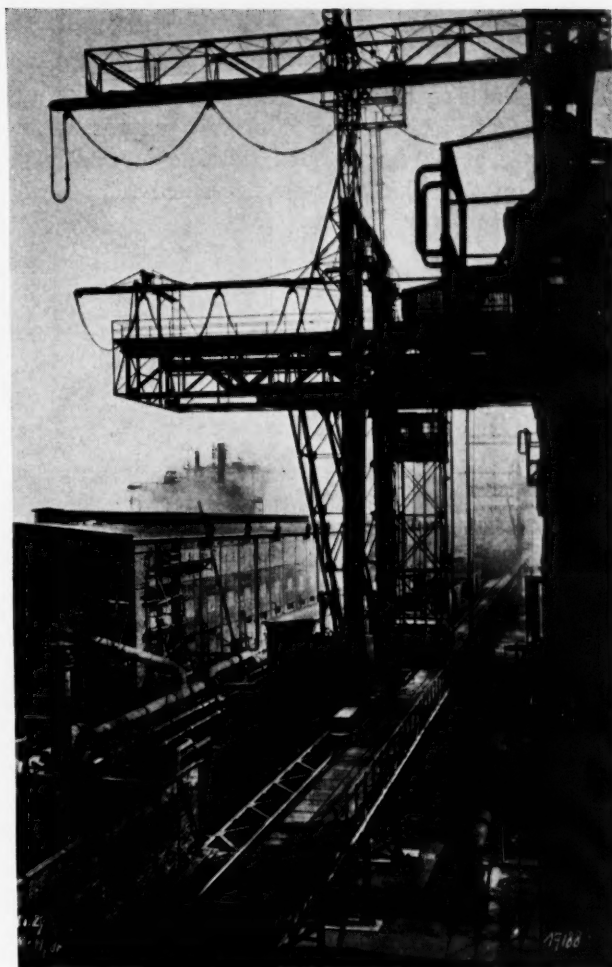
In both stages, the hydrogen required for the reaction is passed in excess through the cycle. The uncondensed hydrocarbons and the hydrogen sulfide originating in the raw materials, are removed from the hydrogen by washing under high pressure, and the latter after replacement of the consumed portion, is returned to the process. The comparison between the cracking process and the hydrogenation process, as presented by the I. G., is interesting. In the hydrogenation process the possibility exists of producing the most varying products, such as gasoline, illuminating oil, tractor motive fuel, gas oils, and lubricating oils of the best quality. In addition, it is possible to produce to meet market requirements. Also, the yields of high grade products are materially greater in hydrogenation than in the cracking process, so that, particularly for German crude oil, the hydrogenation process is decidedly more preferable. To produce



A very important part of the hydrogenation process. A battery of high pressure pumps

100,000 metric tons of gasoline, about 110,000 metric tons of raw material are required for hydrogenation, while cracking requires about 220,000 metric tons. Further, in cracking, the formation of coke, which is deposited in the heating equipment, can never be avoided, hence expensive shut-downs are frequently necessary for the cleaning of the equipment. In hydrogenation the reaction ovens can remain in operation for months, yes, even for years, because no coke is formed. But above all, the hydrogenation process is superior to the cracking process because of the better yields of high grade products. This is particularly important with German petroleum because the production of the latter is still comparatively expensive, since the drilling companies do not yet possess sufficient experience. It can be expected, however, that with an intensive continuation of drilling, Germany will prove to be a country comparatively rich in oil.

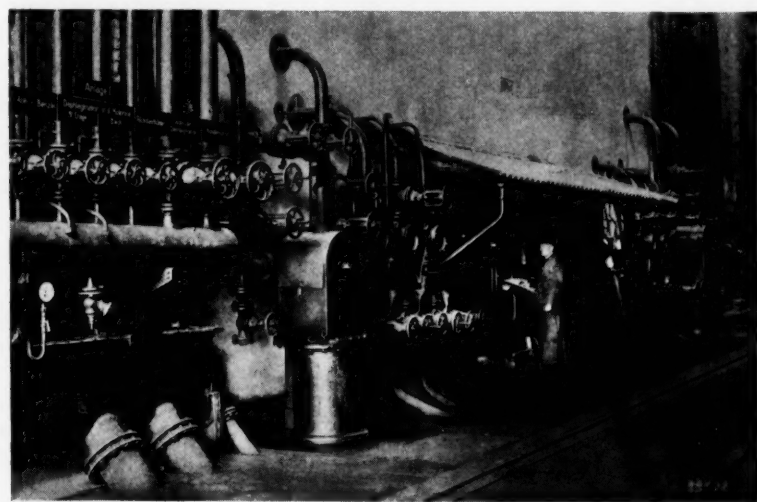
It is regrettable that the German petroleum industry can not develop under the present-day economic conditions for the German potash industry, which has much interest in German petroleum, is today not experiencing satisfactory conditions because of the situation in the fertilizer industry. Thus, the loadings of the German Potash Syndicate during the first seven months of the current fertilizer year,—May to November, 1931—amounted to 4,132,460 metric hundredweights of pure potash, as against 6,199,190 and 6,469,781 metric hundredweights respectively, during the same periods of the years 1930 and 1929. These figures include loadings of the plants for export stocks of the Syndicate. Hence, it is not possible that the amounts, 13,567,279 and 14,014,052 respectively, for the years 1930 and 1929, will be reached during the year 1931. For the months of January to November (inclusive) 1931, the loadings amounted to 9,266,488 metric hundredweights of pure potash. In addition, the prices of fertilizers, which already were below the pre-war prices, were decreased further, and the Potash Syndicate made all kinds of concessions to its customers as to payments. The potash works have been modernized, equipped with machinery, and systema-



Another view of the high pressure plant. Economic conditions have retarded the complete introduction of the hydrogenation process in Germany

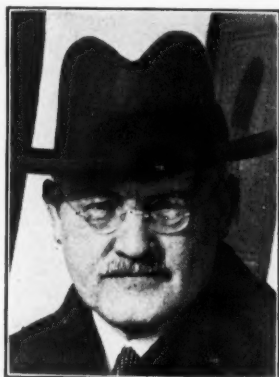
tized to the most far-reaching degree. Thus, according to Mines Assessor Behrendt (*Chemiker Zeitung*, 1931, p. 249), it was possible, by the use of vacuum condensers and cell-fillers in potassium chloride factories, to reduce the entire solution and drying process, —which formerly required several days—to only two to three hours. The output in the mine per man

and shift was 24.71 effective metric hundredweights in 1913, and 32.97 in the factories. In 1930 this increased to 63.06 effective metric hundredweights in the mine and 86.61 in the factory. The average wages, which in 1913 amounted to 4.38 RM. per man and shift, reached 8.54 RM in 1930. Of the world's production of 20,000,000 metric hundredweights of pure potash, Germany is at present supplying about 67 per cent, France 24 per cent, United States 2.4 per cent, Poland 1.94 per cent, and Spain 1.46 per cent. Russia, for the present does not play any role here, nor does Palestine. The great potash corporations, because of present conditions, are devoting themselves with great zeal to the production of by-products, and above all, to the recovery



Control board. Labor is a small problem in the latest large scale distillation processes

of mixed fertilizers free from fillers. In regard to the technical improvement of the plants in the iron and steel industries particular reference is made to the document "Die Deutsche Eisenerzeugende Industrie" ("The German iron-producing industry") of 447 pages issued by the Third Sub-Committee for Trade, Industry, Commerce, and Labor of the Commission for the Investigation of the Conditions of Production and Sale in German Business (published by C. S. Mittler & John, Berlin). It is stated there that the August Thyssen Foundry formerly produced 75,000 metric tons of steel with 10,000 workmen, but is today producing 170,000 metric tons of steel with 9,900 workmen. Rheinstahl and Phoenix have increased their production from 110,000 to 150,000 metric tons, and have, at the same time reduced the number of workmen from 11,000 to 9,600. It is true that in the iron industry also, measures of economy and limitations have resulted in numerous changes, especially in the economy of power and materials in foundry operation (cf. B. v. Sothen: *Chemiker Zeitung*, 1931, p. 944).



Carl Bosch
Nobel Chemistry Prize

Dr. Ernst Schlenker of Berlin thoroughly covers the question of systematizing in chemical plants in the February, 1931 number of the *RKW Nachrichten* of the Reichskuratorium fuer Wirtschaftlichkeit. Schenker covers the improvement of the output in chemical plants, the working processes, the production of power, and energy output, the movement of goods, packing and shipping, the auxiliary plants, stocks of raw materials, operating materials, replacement parts. He believes that the systematizing of operation in the chemical industry, especially in medium-sized and small plants, has not yet been introduced to the extent as in other branches of industry.

No noteworthy foundation of new companies have taken place in the chemical industry during the past year. Of consolidations, mention is made of that of the Deutsche Gold und Silberscheideanstalt vorm. Roessler, with the Verein fuer chemische Industrie A.-G., both of Frankfurt-am-Main. The Scheideanstalt has, for years, been endeavoring to bring about a consolidation of the Verein fuer chemische Industrie with the "Hiag," the Holzverkohlungsindustrie G.m.b.H. of Constance, which, has for a short time belonged to the Scheideanstalt, since conditions in the wood-carbonizing industry requires the application of all possible strength in order to remain profitable against synthetic wood-carbonization products.

Naturally, the German benzol industry is likewise suffering from the poor economic situation,—from the battle in the market for motor fuel. According to the

report of the Benzol Verband G.m.b.H. in Bochum, the production of benzol in 1930 dropped by 15 per cent as compared with 1929, while the sales dropped only by 2.2 per cent. But the figures for 1931 will read entirely different.

With such poor conditions existing in the chemical industry, the status of the German chemists is largely hopeless. According to the recently published official figures of the census of plants and occupations for 1925, there were found in 1925 in the entire German Commonwealth, 10,574 persons whose gainful occupations were mainly as chemists, among them 922 women or 8.72 per cent of the total. About 1,000 chemists had attained directing positions as directors, business managers, etc. But even now, one must figure that there are about 10,000 chemists in Germany, of whom probably 1,500 are out of work. According to the 1930 statistics of the Verein Deutscher Chemiker, 203 chemists found employment (one-third of the number for 1928), while the loss of unemployment, 350, remained almost unchanged. The number of students of chemistry during the winter semester of 1930-1931 was 4,743, as against 4,577 during the winter semester of 1929-1930. These young chemists have no prospects of obtaining positions, since the number of college graduates of all kinds in Germany who will be without positions in 1934 is estimated at 130,000. How many chemists have been discharged during the course of this year and are still to be discharged no one knows. No less a person than Prof. Dr. R. Willstaetter has studied this problem (*Chemiker Zeitung*, 1930, p. 365; 1931, p. 1) and has issued an appeal to the chemical industry of Germany not to economize in the wrong place, but to increase the productivity of its laboratories and institutions by calling in suitable investigators, rich in



Friederich Bergius
Recipients for the year 1931

ideas, who are capable, of keeping a large number of chemists busy with important and profitable tasks. The attempts at placing chemists in plants not specifically chemical, such as foundries, machine factories, gas-works, ceramic plants, building undertakings, electrical works, official bureaus, etc., can naturally, not show any great success under the present difficult economic conditions. Similarly, the prospects for chemists in foreign countries are very slight, and in Russia, where there is, in part, a demand for specialists, conditions are not desirable.

In spite of the pressure of the times, valuable chemical research work was carried out in the industry during the past year. Attention is called to the experiments of Prof. Dr. W. Gluud of the Gesellschaft fuer Kohlentechnik G.m.b.H. in Dortmund-Eving, for

recovering carbon monoxide cheaply and conveniently from blast-furnace gases, in order to utilize it in metallurgy and for chemical syntheses. Mention is made of work on rhenium, discovered by Dr. Walter Noddack and his wife and which, according to Dr. W. Feit, has been recovered since 1929 from residues of the Vereinigte Chemische Fabriken at Leopoldshall, a branch of the Potash Works Aschersleben, Leopoldshall-Stassfurt. After long, wearisome series of experiments, the same firm has also succeeded in making the isolation of gallium so economical that this metal, of the highest purity, can now be purchased at from 8 to 9 RM per gram, instead of 175 RM as heretofore. This increases the possibilities of the utilization of gallium, which has previously been recommended for filling quartz thermometers for high temperatures, 500° to 1000° C., and can now be obtained for coating optical mirrors, for signaling devices, for filling teeth instead of with amalgams, and also for analytical lamps,—for which its properties make it appear suitable, namely, melting-point: about 30° C., boiling-point: above 2,000° C., frequently range from ultraviolet to far into red.

Research in Other Fields

A further great accomplishment of chemical research is the recovery of crystallized vitamin-D by Prof. Dr. A. Windaus and his co-workers of Goettingen, as well as the isolation of vitamin-C and the proof that it is derived from narcotine, as shown by Windaus' student, Ottar Rygh and his wife, and Per Laland.

Of the manufactured novelties mention should be made of viscose sponge, an artificial sponge made by the I. G., the building material "synthoporite," the

fuel "bonalin," the fireproofing materials "intramon" and "locron" of the same firm; the new microporous rubber, all kinds of synthetic resins, alloys, and the like.

Of the expositions held during the past year, attention is directed to the great building exposition, the radio show, and the endeavor to bring about an international adjustment of chemical expositions.

Improved International Relations

It is very pleasing that international relations,—at least in the field of science—have during the past year become closer, that the Chemical Society has again elected former enemy foreigners as honorary members; that an International Atomic Weight Commission is again active; and that after twenty years, a congress, actually international, will again hold sessions as the Ninth International Congress for Pure and Applied Chemistry in Madrid, April 3 to 10, 1932. The award of the Nobel Prizes for Chemistry and Medicine on December 10, 1931, to the three Germans, Frederick Bergius and Carl Bosch, and Otto Warburg respectively, is also a recognition of German research and technology. The life-work of these three men is known. They are still in the vigor of manhood—Bergius was born in 1884, Bosch in 1874, and Warburg in 1883—so that much may still be expected of them.

International relations in the fields of science and technology permit the hope that finally, after the initiation of the Hoover moratorium, the necessary political and economic measures will be undertaken in order to master the world-wide economic crisis, since Germany in its sharp, fourth exigency decree led the way and made incisive regulations.

Energy and chief material required to fix one ton of nitrogen*

Process	Product	Chemical Raw Material		Every Requirement for Nitrogen Fixation and Conversion to Solid		Total Equivalent
		Actual	Coal Equivalent (b)	Electricity (or equivalent)	Coal Equivalent (a)	Coal Requirement
Arc.....	Ca(NO ₃) ₂	Limestone 4 tons	—	more than 80,000 K.W.H.	64 tons	64 tons
Cyanamide.....	Ca CN ₂	Limestone 7.5 tons	—	12,000 K.W.H.	9.6 tons	12.72 tons
Synthetic Ammonia.....	(NH ₄) ₂ SO ₄	Coke from 3.5 tons coal	3.12	—	—	—
		Gypsum 7.1 tons or Anhydrite 5.6 tons	—	—	—	—
Haber Bosch Hydrogen..	—	Coke from 2.5 tons coal	2.23	8,000 K.W.H. (c)	5.04 (e)	7.27 tons
Coke Oven Hydrogen...	—	Gas from 16 tons coal	3.21	4,600 K.W.H. (c)	3.06 (e)	6.27 tons
Electrolytic Hydrogen...	—	12,500 K.W.H. for Electrolysis	10.0 (d)	3,500 K.W.H. (c)	2.8 (e)	12.8 tons

(a) Calculated on modern thermal electricity generating practice requiring 0.8 kg. coal per K. W. H. electricity.

(b) Thermal equivalent (as coal) of coal constituent actually used: i. e. coke or hydrogen of gas.

(c) Including 2,000 K.W.H. for operating plant to fix ammonia as ammonium sulfate.

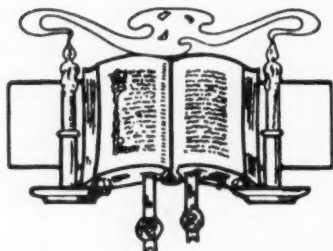
(d) Amount of coal burnt under (a) conditions to generate electricity for electrolysis.

(e) Coal equivalent in practice less than calculated according to (a).

*Acknowledgment, page 104

Chemical Chronology

1931



January

Commissioner Doran, Industrial Alcohol Bureau, announces substitution of alcotate for methanol as denaturing medium.—Trading in Blackstrap molasses futures initiated on N. Y. Coffee and Sugar Exchange.—Swann Corp., acquires Wilckes, Martin, Wilckes, outstanding lampblack manufacturers.—Russell R. Brown resigns from presidency, U. S. Industrial Alcohol.—August A. Wasserscheid, Mallinckrodt's eastern manager elected vice-president.—Chemical stock values appreciate slightly.



February

Congress passes compromise Norris Muscle Shoals Bill.—DuPont announces details of proposed lacquer licensing agreement.—Senate demands data on agreements between Bureau of Mines and methanol manufacturers relative to investigational work on methanol toxicity.—O. F. Weber, Allied Chemical president granted leave of absence and C. W. Nichols is appointed temporary chairman, Executive Committee.—Stocks rise rapidly in bull market.—Declines outweigh advances in chemical prices.



March

President Hoover vetoes Norris Muscle Shoals Bill and proponents fail to muster sufficient strength to over-ride.—Dry Ice loses suit to Carbice.—Dr. John A. Wilson receives the Nichols Medal.—Columbia Chemical acquires Isaac Winkler.—Dinner, Drug and Chemical Section, N. Y. Board of Trade sets new attendance record.—Joseph Turner is appointed selling agent for persulfates by Buffalo Electrochemical.—Alsop Engineering celebrates its tenth anniversary.—General Electric, du Pont, American Cyanamid and Rezyl Corp., form agreement to pool technical information on plastics and resins.—William A. Hamann, R. & H. chairman retires.—Entire "Cosach" issue of bonds is sold.—Allied Chemical's net reported as being \$5,000,000 under 1929 figures.—Deaths, Dr. John E. Teeple, Thomas R. Evans, president Diamond Alkali; Philip O. Schleussner, vice-president, R. & H.; William R. Peters, noted chemical merchant of an earlier day.



April

Robert T. Baldwin is elected A. C. S. treasurer to succeed Dr. Teeple.—1930 U. S. Dye Census Report features world-wide manufacturing curtailment.—U. S. Supreme Court agrees to reopen Carbice Dry-Ice litigation.—F. W. Miller is appointed vice-president, Swann Corp.—Stockholders of Anglo-Chilean and Lautaro formally approve joining \$375,000,000 "Cosach".—U. S. Potash Co., makes first commercial shipment of potash from Carlsbad, N. M. mines.—Spot alcohol prices are raised from record low figure.



May

Thirteenth Chemical Exposition is held at the Grand Central Palace.—E. M. Allen and Dr. Arthur D. Little address the 7th Chemical Industries Dinner.—George C. Lewis is elected president, Chemist Club.—Secretary Mellon and brother are awarded annual American Institute of Chemists' Medal.—Philadelphia Quartz celebrates its one hundredth birthday.—U. S. foreign trade is off in first quarter of 1931 from corresponding period a year previous.—A number of lacquer manufacturers form association to pool interests in combating duPont licensing agreement.—Orlando F. Weber is re-elected president, Allied Chemical.—DuPont purchases remaining outside half interest in Eastern Alcohol.—Texas Gulf Sulphur places stock on a \$3.00 basis.—William S. Gray is appointed selling agent for Western Borax Co.—Russell R. Brown is elected chairman of the board, American Commercial Alcohol.—Deaths: E. T. Bedford, president, Corn Products, Dr. Samuel W. Parr.



June

International synthetic nitrogen producers fail to agree on terms at Paris meeting.—Dr. William J. Hale, Dow organic research director addresses annual meeting Manufacturing Chemists' Association.—National Fertilizer Association meets at White Sulfur in attempt to adjust conditions to meet decline in fertilizer consumption and American Institute of Chemical Engineers convenes at Swampscott, to hear symposium on New England industries.—Senator Bingham proposes bill to curb "volatile poisons".—DuPont enters first suit against Glidden in infringement of lacquer patents.—Methanol producers reach agreement with U. S. Public Health Service on use of methanol in anti-freeze mixtures.—Victor Chemical Works purchases the phosphate lands of Globe Phosphate Co.—Sulfur companies protest county assessments in Texas.—George Cooper is appointed sales manager, Diamond Alkali.—Stock market registers impressive gains.—American Cyanamid stockholders approve change in capital structure.—Monsanto stockholders are offered rights.—Deaths: John W. Daniels, chairman of the board, Archer, Daniels, Midland Co.; Frank Hemingway, well-known chemical manufacturer.



July

International conference between synthetic and natural nitrate producers fails to reach agreement.—DuPont acquires Newport Chemical.—Krebs Pigment Co., is formed by duPont and Commercial Solvents.—George Y. Frankle is appointed sales manager, Swann Chemical Co.—Westvaco authorizes sale of 59,807 additional shares with rights issued to stockholders.—Monsanto reports 1931 earnings in excess of those for 1930.—Corn Products acquires substantial interest in Resinox, synthetic resin subsidiary of Commercial Solvents.—Deaths: Dr. Edward Goodrich Acheson, John L. Agnew, Vice-President, International Nickel.



August

New dirigible Akron is supplied with helium requirements from Government

Amarillo Plant.—Chemical industry is represented at freight rate hearings before I. C. C., by Harry M. Mabey opposing carriers' plea for 15% increase.—International zinc cartel is declared operative.—Solvay celebrates 50th Anniversary.—Chemical executives, Col. William C. Proctor, George Eastman, Walter Teagle, and Pierre S. duPont are appointed on President Hoover's Unemployment Relief Committee.—New State-Federal Muscle Shoals Committee issues requests for bids.—Deaths: F. M. (Borax) Smith.—Frank J. Tone is selected as first winner of the Jacob F. Schoellkoff Medal of the Western New York Section of the A. C. S.—Dr. Linus Pauling, California Institute of Technology, is awarded the Langmuir Prize of the A. C. S. as the outstanding young chemist of the nation.—Monsanto and Mac Lac-Kasebier-Chatfield make first chemical shipments by America's first air freight service.—Du Pont Ammonia is dissolved and its assets and business transferred to the parent company.



September

W. D. Huntington, chairman, Manufacturing Chemists'

Association informs President Hoover that body is in favor of six hour day.—Tariff Commission holds stormy meeting on petition for lower rate on feldspar requested by importers.—Victor M. O'Shaughnessy resigns as President American Solvents & Chemical.—Industrial Alcohol Bureau issues procedure booklet.—Dr. L. V. Redman is announced as Grasselli Medalist.—Deaths: C. Harold Smith, founder, Binney & Smith and well-known as the "Carbon King", Henry W. Huning, Mallinckrodt vice-president.—Alvarez, Grasselli, again wins golf championship of the Chemical Salesmen.—Dr. Killheffer, Newport, vice-president goes to Europe to re-arrange Newport foreign connections.—H. L. Derby, president, Kalbfleisch, is re-nominated for a directorship in National Association of Manufacturers.—Price for copperas is higher, prices for bismuth and magnesium lower.



October

Hercules purchases Paper-makers Chemical.—Railroads are refused 15% increase with chemical industry playing prominent

part in testimony taken before I. C. C. Committee.—Brig. Gen. Herman A. Metz is honored on completion of 50th business anniversary.—Horace M. Bowker is charged with chairmanship of Chemical and Paint Division, Unemployment Relief Committee.—Muscle Shoals Committee is engaged in final preparations of report.—New bichromate of soda producer, Standard Chromate, is announced.—Dye Census is discontinued by Tariff Commission.—Charles F. Burgess is announced as 1931 Perkin Medalist.—Deaths: George M. Eno, J. M. Matthews.—Indicted Alcohol companies represented by Edward L. Koontz.—Bersworth Laboratories begin production of ethylene diamine.—

Natural Products Refining opens New York offices and completes large addition to Jersey City works.—Element 87 is discovered by Jacob Papisti.—Henry M. Toch, Standard Varnish chairman, resigns and is succeeded by Maximilian Toch.



November

DuPont announces synthetic rubber.

Bondholders and stockholders, American Solvents & Chemical form protective committees as interest on several bond issues of merged companies is defaulted.—"Cosach" terms are attacked by Lautaro preference stockholders.—U. S. Timber Commission acts to stabilize naval stores industry.—British Parliament acts to continue dye import restriction.—Muscle Shoals Committee reports in favor of plan of private ownership preferably by a farmer's cooperative organization.—French Government threatens complete restriction of all nitrate importations.—International copper conference ends in agreement after several reported failures.—A. Cressy Morrison is honored with Morehead Medal for 25 years' service to the International Acetylene Association.—James W. McLaughlin, Union Carbide is made member Advisory Council of the Bureau of Industrial Alcohol.—Stauffer forms Pacific Hard Rubber.—G. Lee Camp and L. F. Nickell are elected directors, Monsanto.—Carl Bosch and Friederich Bergius jointly receive Nobel Chemistry prize.—Merrimac completes 16 months rebuilding and consolidation plan one month ahead of schedule.—Dr. William J. Hale addresses Bituminous Coal Conference.—National Fertilizer Southern Convention plans for reorganization of many phases of the fertilizer industry.—Consolidated Lead calls meeting of stockholders to vote on proposed merger with Eagle Picher Lead.—Net income of 11 leading chemical companies is off 29% for the third quarter and 29% for the first 9 months when compared with 1930.—Allied fails to take action on usual 5% stock dividend.—Deaths: Prof. Walter Reid, inventor of smokeless powder, Thomas A. Kirkham.



December

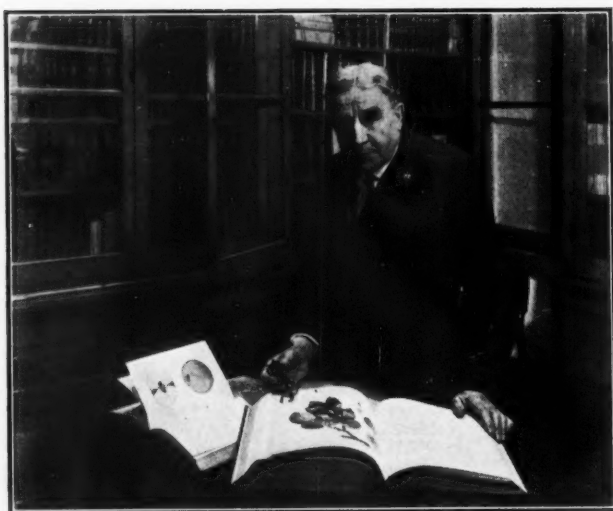
President Hoover sends Muscle Shoals Report to Congress.—Unemployment

Committee, Chemical and Paint Division goes over quota.—Chemical Engineers report labor unhurt by technical gains.—Annual report, Bureau of Industrial Alcohol shows drop in consumption for fiscal year ending June 30, 1931.—W. D. Huntington, vice-president, Davison Chemical is appointed head of fertilizer sales for Cyanamid.—Carbide and Carbon initiates commercial production synthetic butyl alcohol.—Great Britain imposes import tax on several industrial chemicals.—Chandler Medal is awarded to Prof. James Bryant Conant, Harvard.—Charles H. Proctor, dean of the plating industry, retires.—Commercial Solvents wins patent suit against Union Solvents.



Synthetic Resins Are Here To Stay*

By E. C. Holton¹



THE first synthetic resin to be used in this country to any great extent was the rosin glycerol ester or ester gum. To the chemist this is truly a synthetic resin although some do not consider it as such since rosin, which is derived from a natural resin, enters into its composition.

Ester gum was offered on the American market in the early nineties and it was about twenty years later before it came into general use. In March, 1893, C. H. Kiessig, New York, offered it at eight cents per pound, and the claim was made that it was used in the paints and varnishes protecting the Eiffel Tower.

Rosin ester is far superior as a varnish material to either raw rosin or rosin hardened with lime. Ester gum is the result of a chemical condensation of abietic anhydride (rosin) and glycerol (glycerine) with the elimination of water. If certain organic acids such as phthalic, succinic, or maleic acids or their anhydrides or other related compounds are substituted for rosin in this reaction with glycerine, we obtain a class of resins known as the Watson Smith type or polyvalent acid poly-alcohol resins or the alkyd resins or glyptals. Since various glycols and other poly alcohols may be substituted for glycerol there are many combinations possible.

There is another class of synthetic resins in which a condensation of a phenol with an aldehyde takes place and water is eliminated as in the preceding. Since there are many different phenols and many aldehydes it is possible to produce many very different resins of this type. Yet for commercial reasons most of the resin of this type is produced from the simpler phenols and formaldehyde and its polymers. The para coumarone paraindene resins are produced from the distilled oils which are obtained in the conversion of bituminous coal to coke. The production of these resins is the largest manufacturing example of resin forming polymerization. The distillate used has a boiling range of approximately 300 to 390 degrees F. and contains the class of material generally known as coumarone and indene. Sulfuric acid is used to polymerize these to resinous products. The desired result is a pale hard resin fast to light and air. The better resins consist almost exclusively of polymers of coumarone and indene. After these resins have been produced and are still in solution in the unpolymerized distillate they are very thoroughly washed with water, then with alkali solution and again with water until all traces of acid and alkali have been removed. The solvent is distilled off leaving the resin in the still. The resin is neutral and quite resistant to both acid and alkali.

From another fraction of the distillates obtained from coal is obtained the well-known solvent, benzol. Benzol is condensed to biphenyl and from this by treatment with chlorine the Aroclors are formed.

In modern processes for cracking petroleum many unsaturated hydrocarbons are produced. These can be readily condensed to form new compounds. Certain fractions of these distillates when condensed yield excellent resins.

Very interesting, beautifully clear and colorless resins are being produced by the condensation of vinyl esters and related products. The vinyl esters may be made from acetylene and from products derived from the cracking of petroleum.

The bi-products obtained from coke ovens and the oils and tars from the manufacture of illuminating gas

*Abstracts of Address before Federation of Production Clubs 10th Convention.
¹Head of Executive Research, Sherwin-Williams.

from coal are the raw materials from which many synthetic resins are produced. The phenols entering into the phenol formaldehyde resins come directly from this source, or indirectly, by synthesis from benzol derived from this source.

The organic acids used in the synthesis of polyvalent acid polyalcohol type are synthesized from naphthalene, benzol and related compounds derived from the same source. The Aroclors are also derived from benzol by way of biphenyl.

Today various aldehydes, alcohols, ketones and acids are being made by synthetic processes from producer gas as well as from acetylene and petroleum, hence we can now rest assured that until our supplies of coal and petroleum fail us we will always have the raw materials needed for making synthetic resins.

Characteristics of Various Resins

It is essential that we should know the general characteristics of each product and the manufacturers stand eager and ready to supply this information.

Imperial ester gum No. 8 has a melting point of 98 degrees C. and an acid value of 6-8. Imperial X pale ester has a melting point of 93 degrees C. and an acid value of 6-8. These are the esters most commonly used in the varnish, paint and lacquer trades today and are widely used by some of the leading paint companies in many classes of work.

Imperial BK gum has a melting point of 125 degrees C. and an acid value of 6-8. This is a very hard ester gum and by its use many superior black enamels may be formulated. It may be handled in practically all respects the same as the ordinary types of ester gum.

Lewisol No. 1 has a melting point of 122-125 degrees, an acid value of 6-8, and a specific gravity of 1.125. Lewisol No. 2 has a melting point of 132-135 degrees, and an acid value of 6-8, and a specific gravity of 1.143. It is soluble in ethyl, butyl, and amyl acetates, butanol, pentasol, benzol, toluol and xylol, cellosolve and butyl cellosolve, ethyl and butyl lactates and turpentine. It is insoluble in petroleum naphthas and ethyl alcohol. Lewisol No. 2 is generally used in varnishes and when properly formulated gives liquids of a very pale color, of excellent flow, gloss and durability. Grinding vehicles can be made with Lewisol No. 2 having very low acid values and hence are inert to basic pigments such as zinc oxide. In spite of the low acid value, Lewisol No. 2 appears to impart good wetting qualities to most pigments. Varnishes formulated with Lewisol yellow less in sulfur dioxide fumes than any other samples of varnish we have tested. Short oil varnishes in most instances are more inert to these fumes. Lewisol No. 2 is also used in lacquers and makes excellent sanding sealers.

Lewisol No. 3 has a melting point of 88 degrees C., an acid value of 6-8 and a specific gravity of 1.113.

It is essentially a lacquer gum and many fine lacquers may be made with its use. These have exceptionally good durability, flow, gloss and rubbing qualities. It has been suggested that the addition of a small amount of Lewisol No. 3 in xylol be added to enamels and varnishes to generally increase the flow and durability. Lewisol No. 3 is soluble in the same solvents as Lewisol No. 2 with the exception of turpentine in which it is insoluble.

Paracoumarone-Paraindene resin is neutral, having an acid number of approximately 0.2. In products where low acidity is desired this is a valuable resin. It is a non-saponifiable material and is less affected by alkalis than most other resins. This makes it of value in coatings designed to resist alkalis and soaps. The resistance of this resin to water, brine and all but the strongest acids, makes it valuable in corrosion resistant paints and varnishes. Weather durability and abrasion resistance gives this resin a valuable place in coatings to withstand severe exposure. The electrical breakdown strength of this resin is 1,200-1,400 volts per mil thickness. This desirable electrical strength coupled with its high dielectric constant makes it valuable for use in many forms of insulation and particularly in condenser insulation. It maintains its electrical properties well, under conditions of high humidity. It has a low iodine value which is one reason for its resistance to oxidation. It behaves well in compositions exposed to moderate heat for long periods. The harder grades do not ignite easily.

Phenol-Formaldehyde Resins

The best known resins of this type are "Bakelite"; "Beckacite"; "Dura C"; "Durez"; "No. 226."

This class includes a series of phenolic condensation products possessing properties which make them unusually valuable in varnishes, lacquers and paints. They are different from any other synthetic resins previously available, in that they contain absolutely no rosin, ester gum, oils, or any other foreign or inactive ingredients. Unlike the older types of primarily heating reactive phenol resinoids, they are soluble in drying oils without the necessity of adding other materials, such as rosin, to promote solubility. The advantage of this to the varnish industry lies in the fact that these new materials can be employed in any proportion which may be necessary to meet any given requirements of service, cost, etc. They may be used with oil "straight," that is, without dilution with resins, to produce coatings of exceptional quality, or they may be used in small proportions in conjunction with any of the well-known natural or artificial resins, to secure improved quality at low or moderate cost.

No. 1001 Super-Beckacite is a straight phenolic condensation resin, free from rosin and other inactive ingredients, which on first appearance, appears to have a dark reddish color, but which is actually a pale

resin when combined with drying oils in a varnish formula. This new heat-hardening resin is adapted to an infinite number of uses, and may be used alone or in relatively small proportions in conjunction with other resins to produce distinctly superior properties in the finished product. It will be found advantageous in formulating almost any product in which the common drying oils are used, including long oil and short oil varnishes, enamel liquids and paint vehicles. It is soluble in all of the common drying oils such as linseed oil, china wood or tung oil, perilla and soya bean oil. One of the outstanding merits of this heat-hardening resin is its favorable effect on drying oils in furthering durability, quick drying, non-yellowing and toughness of film.

Modified phenol-formaldehyde resin. In addition to the straight phenol-formaldehyde resins we have modifications of these such as some of the Amberols, Paranols, etc.

Amberol may be described as a modified phenol formaldehyde resin, and is made in several distinct grades. The different grades combine, in general, the characteristic of hardness, long associated with the fossil gums, with the special property of modifying china wood oil so as to give quick-drying varnishes. Recent developments have extended the usefulness of this resin. They include Amberol K-12-A, in which hardness is developed to a maximum; and Amberol 226, characterized primarily by its modifying action on china wood oil. Amberol 801 is a recently introduced lacquer type resin, characterized by greater hardness than is present in other resins compatible with nitro-cellulose.

Paraplex—a lacquer plasticizer giving permanent flexibility and durability in a manner and to an extent which cannot be obtained with other products.

Amberol B-S-1, introduced in 1924, came into wide use with the development of quick-drying enamels. While still widely used, the harder Amberol F-7 constitutes an improvement on Amberol B-S-1 for most purposes.

Amberol F-7 represents a resin characterized by its very wide range of usefulness in all types of quick-drying varnishes and enamels.

For certain types of varnishes, a need appeared for more rapid through hard drying than could be obtained with Amberol F-7. Amberol K-12-A successfully meets this need. Within the past year, it has been adopted widely and successfully in the use of rubbing varnishes, baking varnishes and enamels—particularly where rapid baking is required—and in many other types of varnishes where rapid through hard drying is desired.

This grade of Amberol differs from the other types in that it is adapted primarily for use in cooking china wood oil varnishes at low temperatures. These varnishes possess unique elasticity and durability. The durability of long oil varnishes made from Amberol

226 is outstanding, being much greater than that obtained with ester gum, fossil gum, or even Amberol F-7. However, this type of varnish is often used to greatest advantage by blending with varnishes made from Amberol K-12-A and Amberol F-7 in varying proportions.

Amberol 801 represents a different type of resin from the varnish Amberols, being characterized by complete compatibility with nitro-cellulose and very great hardness. This outstanding hardness permits a corresponding latitude in formulation and in the adjustment of the ratio of nitro-cellulose, resin and plasticizer. This latitude may be utilized to formulate cheaper lacquers by increasing the resin and plasticizer ratio to cotton, or reducing the ratio of flattening agent, without impairing hard drying, durability or sanding qualities. Alternately, for a given ratio of resin to cotton, it permits a higher proportion of plasticizer and gives a more durable lacquer.

Paraplex RG-2 occupies a unique position amongst plasticizers for nitro-cellulose. It gives a degree of permanent elasticity and of durability to outside exposure which cannot be obtained with the use of other plasticizers or resin plasticizers. It is being used in all types of lacquer, including clear durable lacquers for wood and metal, automobile lacquers, lacquers for rubber, coated fabrics, paper, etc.

Petroleum Resins

These resins are produced from certain purified fractions of cracked petroleum distillate.

Of resin No. 200 the producers say the resin is almost neutral having an acid value of 1.0 to 2.0. The saponification is very low, having a value of 5 to 15. The iodine value ranges from 140 to 150. The melting point is 103 to 108° C. The resin is very resistant to water, acids and alkalis. It has a combining reaction with drying oils such as china wood and linseed oils. The color does not darken in processing with the drying oils. The resin has no after yellowing in color.

And of 53 C and 76 D they say there are numerous uses for these two new plastics which include bronzing liquid, water-proofing of cloth, fabric wood, paper and metal surfaces. Because of their high resistance to alkalis and acids they are particularly interesting for grinding liquids for preparing primers for plastered walls and wall boarding, machine paints, refrigerators and automobiles.

Advantages of the Aroclors

These chlorinated biphenyls are very stable chemically. They are not subject to hydrolysis under any ordinary conditions, nor do they become rancid. The Aroclors are very resistant to oxidation, and they are strictly non-drying in their characteristics. Unlike many other synthetic materials that have similar uses, they are not subject to polymerization. They may

be heated indefinitely at 160° C. and at higher temperatures.

They are being used with success in combination with nitrocellulose and in regard to their use in varnish the producers state that experiments to date point to the following conclusions:

1. The Aroclors retard the polymerization of china wood oil more than most other resins, and therefore can be cooked with this oil with less danger of overbodying and loss of the batch than most other synthetic resins.
2. The Aroclors seem to darken much less under heat than most other resins.
3. Being practically neutral, Aroclor varnishes do not thicken with zinc oxide. Since the tendency to overcook wood oil is less with the Aroclors than with most other synthetic resins, there is also less danger of livering with zinc due to this cause.
4. Very quick drying Aroclor varnishes and paints can be made.
5. The Aroclors of low melting points tend to yield products having a slight permanent tack when used in large proportions. When used in smaller proportions or when pigmented, tack-free products may be made. These Aroclors have plasticizing as well as resin properties.
6. The harder, high melting point Aroclors may be very satisfactory for making hard, quick-drying varnishes that are to be applied clear.
7. The resistance to alkalis and other chemicals shown by the Aroclors indicate that they would be especially suitable for making chemically resistant finishes, flat whites and wall primers and fume resistant paints in general.

Work is being done with Aroclors in the manufacture of quick drying outside paints. Work along this line also is inconclusive on account of exposure not having run long enough to cause any breakdown in coating.

Glycerol Phthalate Type of Resins

The Rezyls and Teglaes are types of this class. Of these the producers state that outstanding among the newer types of raw materials for surface coatings are the modified glycerol phthalate resins known as Rezyls and Teglaes. While for the sake of convenience they are grouped as "phthalate resins" the actual ingredients may include a wide range of polybasic acids, polyhydric alcohols, and modifying agents cooked under different conditions to produce a tremendous variety of resins suited for use in such widely different finishes as nitrocellulose lacquers, cellulose acetate lacquers, paints and varnish products, so-called synthetic finishes, textile and paper coatings, water solutions, and others.

The Rezyls and Teglaes range from viscous liquids to hard brittle solids and in color from deep amber to water white. These are not mere differences in quality produced by the use of more or less carefully refined

raw materials or by dilution with ester gum or other cheap materials. They are distinctly different compounds designed for specific uses. In spite of their differences the Rezyls have certain characteristics in common, the most outstanding being their development and retention of adhesion and elasticity with age coupled with opacity to ultra violet light and a remarkable durability on weather exposure.

The Rezyls for use in paints are unsaturated glyceryl phthalate resins which dry by polymerization and oxidation in a manner similar to drying oils and oleo-resinous varnishes when exposed to the air in thin film. Rezyls No. 110 and No. 1103 are miscible with many oils and varnishes and may therefore be incorporated, if desired, in paints containing such ingredients.

One of the interesting possibilities for this oxidizing type of Rezyl is the production of quick drying paints which are characterized by extremely good durability, adhesion, and retention of gloss and color. The first essential requirement of such a paint is ease of brushing for which Rezyl 1103 has been especially developed. This Rezyl gives solutions of low viscosity when it is mixed with drying oils and mineral spirits. This in turn permits the production of easy brushing paints with a reasonably high pigment concentration which can be tinted with ordinary paste colors ground in linseed oil. Such a Rezyl paint will dry dust free in three to four hours and hard enough to recoat in about eight hours.

Resins from Acetylene, Etc.

The Vinylite resins are finding their widest application under abnormal corrosive conditions in industrial plants. They are also being used to an increasingly large extent for refinishing railroad equipment, for coating beaters in paper mills, on barges and boats, and in fact, in practically all places where resistance to corrosive action is a prime factor.

Rather recently, one paint manufacturer has introduced this material as an industrial finish for office building, laboratories, laboratory furniture, and to some extent, in houses. Its chief advantage in these uses is that the walls may be washed with a strong soap or any cleaning compound without affecting the finish.

The pigmentation of paints and lacquers prepared from these resins is similar to the practice followed in the lacquer industry.

It must be understood that these resins are still in the development stage and we are naturally very hesitant in making very definite claims or recommendations 'till they have been thoroughly tested in actual use.

It is suggested that Resoglaz may be used in clear metal lacquers and as a base for high grade white or light tint enamels. It is not compatible with nitrocellulose.

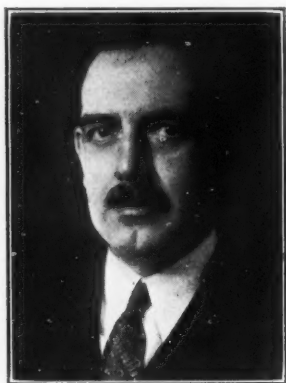
The Mowiliths and AW I, AW II and AH may be used in combination with nitrocellulose and also in oleo-resinous varnishes.

Synthetic resins are here in force and they have come to stay. They are being used in all types of finishes in which natural resins have been used, sometimes alone and sometimes in combination with natural resins. We can rest assured that the resins themselves will be constantly improved in quality and lowered in price. We must learn how to use them to the best advantage. There is much to be learned. Some of these resins are so complicated in structure that we may never know exactly what they are, but we must know their properties and unless satisfactory methods for testing can be devised, we must be given assurance by the manufacturer that there will be no change in his formulation or process unless he so advises the user. Many of these resins are being used in combination with nitrocellulose to great advantage. After seeing such resins as Resoglaz and Mowilith and other Vinylite resins, one is led to believe that the time may come when introcellulose will not be needed in lacquers, but that time is probably still far away.

Association News

December was marked by several important association meetings; A. I. Ch. E. at Atlantic City, Dec. 9 to 11 inclusive; Insecticide & Disinfectant Manufacturers' Association at New York, Dec. 7 and 8, Synthetic Organic Manufacturers' Association also at New York, Dec. 10.

A symposium on pollution by industrial wastes featured the meeting of the Chemical Engineers, Albert E. Marshall, prominent N. Y. consulting engineer and vice-president of the Institute presiding.



Albert E. Marshall
Elected vice-president,
A. I. Ch. E.

Utilization of synthetic methanol as fuel for internal combustion engines was discussed by F. C. Zeisberg, technical investigator, duPont. Mr. Zeisberg reported methanol is a knockless fuel and that it has excellent efficiency and can be produced to sell at from 25 cents to 30 cents per gallon. The following officers were elected by the institute:—President, John V. N. Dorr, Dorr Co.; vice-president, Albert E. Marshall; executive secretary (re-elected), Frederick J. Le Maistre, Philadelphia; treasurer (re-elected), Martin H. Ittner.

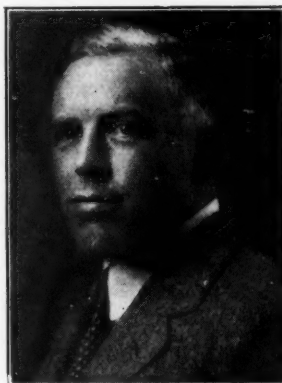
More than 350 chemists gathered at annual symposium, organic division, A. C. S. at Yale University Dec. 28, 29 and 30.

Among those on the program were Drs. Marston T. Bogert and H. T. Clarke, Columbia, Prof. Treat B. Johnson and Dr. Richard Burns, Yale, Dr. Phoebus A. Levene, Rockefeller Institute for Medical Research, Professors Louis F. Fieser and J. B. Conant, Harvard, Dr. W. H. Carothers, du Pont, Dr. Frank C. Whitmore Penn. State, Dr. C. S. Hudson, National Institute of Health and Dr. Reynold C. Fuson, University of Illinois.

The chairman of the division was Dr. Homer Adkins, University of Wisconsin.

A. C. S. Elections

Election of Prof. A. B. Lamb, Harvard, as president, A. C. S., for 1933 announced Dec. 10. The president for 1932 is Dr. L. V. Redman, Bakelite, who succeeded Prof. Moses Gomberg on Jan. 1. Following directors were elected: E. M. Billings, Eastman Kodak, for the second district, Prof. Roger Adams, University of Illinois, Indiana, Michigan and Wisconsin. R. E. Wilson, director and in charge of the development and patent department of the Standard Oil Co. of Indiana, was named director at large. Mr. Wilson is chairman of the society's division of industrial and engineering chemistry. These councillors at large were chosen: G. J. Esselen, Boston; Prof. R. A. Gortner, University of Minnesota; Prof. E. E. Reid, Johns Hopkins, and E. R. Weidlein, director, Mellon Institute.



Prof. A. B. Lamb
Will guide A. C. S. in 1933

Manufacturing chemists' committee, drug section, N. Y. Board of Trade, Inc., met Dec. 29 at the Empire State Club to make up an annual report on conditions prevailing in metropolitan territory.

Members of the committee are: Victor E. Williams, chairman, Monsanto; A. A. Teeter, Chas. Pfizer; H. A. Stebbins, Merck; A. A. Wasserscheid, Mallinckrodt; and R. D. Keim, E. R. Squibb.

The Christmas party of the section was held at the Pennsylvania, Dec. 17. Those seated at speakers table were: A. Bakst, Bakst Bros.; S. B. Penick, S. B. Penick & Co.; F. J. McDonough, N. Y. Quinine & Chemical; Evans A. Stone, president, Insecticide and Disinfectant Manufacturers' Association; P. C. Magnus, Magnus, Mabey & Reynard, Inc.; Charles A. Prickett, Upjohn Co.; S. W. Fraser, Burroughs, Wellcome & Co. Mr. Stone asked drug section if they would do something regarding new regulation for N. Y. City on sodium fluoride which must be colored Nile blue.

Five new directors were introduced; H. Weicker, Dodge & Olcott; Elmer Hessler, G. S. Stoddard & Co.; C. Leith Speiden, Innis, Speiden & Co.; George Simon, Heyden Chemical, and S. W. Fraser, Burroughs, Wellcome.

Additional Business Meetings

Discussion of business conditions and trade practices featured 10th annual meeting, Synthetic Organic Chemical Manufacturers' Association, held in Hotel Commodore. Representatives of the majority of member firms were present, and attendance at the luncheon session was large.



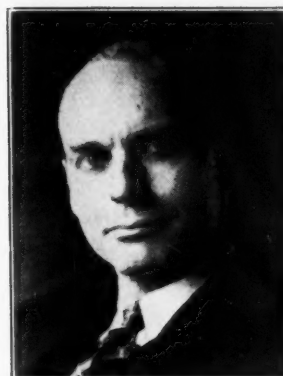
August Merz
Drafted once more to lead

August Merz, president, occupied the chair at both sessions. Election of officers, Disinfectant & Insecticide Association, resulted in unanimous election of Evans E. A. Stone, president, William Peterman, Inc., as president, succeeding Dr. Robert C. White, Robert C. White Co. Standardization and labeling problems received particular attention. It was decided to hold the summer meeting again at the Edgewater Beach Hotel, Chicago.



Extending the Uses for Sodium Perborate

James McKeown above and M. E. Stewart right, both of the Roessler & Hasslacher Technical Division, outline in detail the commercial uses now known for sodium perborate and give chemical and physical properties that suggest strongly many additional interesting commercial possibilities.



THE early process for producing sodium perborate was chiefly experimental, to furnish data from which could be developed suitable apparatus and procedure. Nevertheless, a considerable quantity of dry, marketable perborate was produced and output increased substantially. About 1915, perborate became established as a standard oxidizing agent for many specialized purposes. The useful properties of perborate had been known, but high price limited the use to a few specialized preparations—washing powders, dentifrices, pharmaceuticals, and the like—but with improved, more economic manufacture, it was possible to offer the chemical at prices which stimulated an interest and led to the development of new uses requiring large amounts. Typical of these new uses are the present day bleaching, dyeing and oxidation processes, which are now the largest consumers.

Stability of Sodium Perborate

Commercial sodium perborate is stable in air as the tetrahydrate— $\text{NaBO}_3 \cdot 4\text{H}_2\text{O}$ —which crystallizes in transparent monoclinic crystals. On heating in air, the monohydrate can be formed; the anhydrous salt can be obtained by drying in vacuo over phosphorus pentoxide. The monohydrate is hygroscopic and reverts to the tetrahydrate on exposure to a humid atmosphere. When heated to 150-200° C, sodium perborate melts with evolution of oxygen and water,

forming the meta-borate (NaBO_2). Sodium perborate is moderately soluble in water at normal temperatures, as is shown by the following table:

Temperature	Grams of Sodium Perborate per liter of water
15° C	25.5
21° C	26.9
26° C	28.5
32° C	37.8

Action of Perborate in Water

Solubility in water is increased by the presence of a small amount of tartaric acid, citric acid, or glycerol. The water solution is slightly alkaline and is readily controlled to give an efficient oxidizing liquor. The heat of solution in water is -11.54 calories at 16.1° C and in $\frac{1}{2}\text{N}$ sulfuric acid is -8.95 calories at 17.3°C³. No appreciable amount of oxygen is lost by sodium perborate when it is dissolved in acidulated cold water.

Commercial sodium perborate contains 9.5% to 10.0% of available oxygen. This active oxygen is liberated when perborate is caused to decompose in aqueous or acid solution. The rate of decomposition in water solution can be controlled by regulating the temperature, the evolution of oxygen beginning at about 40° C and increasing in rate with a rise of temperature. At 60° C a 5% solution is completely decomposed in two hours, while at 100° C decomposition of a 5% solution is complete in 10 minutes. The

following table shows the effect of temperature on the rate of decomposition of perborate solutions:

Sodium Perborate - 1% Solution		
Time	Temperature	Available Oxygen Per 100 cc.
Start	60° C	0.1000 grams
20 minutes		.0408 "
50 "		.0208 "
90 "		.0136 "
110 "		.0096 "
140 "		None
Start	70° C	0.1000 "
30 minutes		.0200 "
45 "		.0120 "
60 "		.0064 "
75 "		.0032 "
90 "		None
Start	80° C	0.1000 "
15 minutes		.0216 "
30 "		.0048 "
45 "		.0016 "
55 "		None
Start	90° C	0.1000 "
5 minutes		.0304 "
10 "		.0096 "
15 "		.0050 "
20 "		None
Start	100° C (Boiling)	0.1000 "
5 minutes		.0064 "
10 "		None

Sodium Perborate - 2% Solution		
Time	Temperature	Available Oxygen Per 100 cc.
Start	60° C	0.1968 grams
10 minutes		.1040 "
20 "		.0790 "
30 "		.0608 "
50 "		.0344 "
70 "		.0136 "
90 "		.0096 "
110 "		.0032 "
140 "		None
Start	80° C	0.1968 "
10 minutes		.0416 "
20 "		.0144 "
30 "		.0056 "
40 "		.0032 "
50 "		None
Start	100° C (Boiling)	0.1968 "
5 minutes		.0096 "
10 "		None

Sodium Perborate - 5% Solution		
Time	Temperature	Available Oxygen Per 100 cc.
Start	60° C	0.4960 grams
20 minutes		.0984 "
50 "		.0400 "
70 "		.0320 "
90 "		.0144 "
110 "		.0064 "
140 "		None
Start	80° C	0.4960 "
5 minutes		.0872 "
15 "		.0360 "
25 "		.0216 "
35 "		.0120 "
45 "		.0064 "
55 "		.0024 "
65 "		None
Start	100° C (Boiling)	0.4960 "
5 minutes		.0168 "
10 "		.0032 "
15 "		None

Decomposition of perborate solutions is accelerated also by the presence of borax and sodium hydroxide, resulting on dissociation, by many metallic catalyzers, and by some ferments and animal tissues.

The effects of various metals and metal salts on the rate of decomposition of perborate solutions are indicated in the tables below:

Decomposition is accelerated: Strongly by platinum, gold, silver, mercury, copper. Slightly by iron, nickel, and zinc.

Decomposition is not affected by: tin, magnesium, monel metal, chrome steel alloys.

Decomposition is accelerated by: salts of platinum, gold, iron, copper, nickel, lead, mercury, and zinc, sodium carbonate and manganese sulfate; chromium salts in acid solution.

Decomposition is not affected by: salts of aluminum and tin; chromium salts in alkaline solution.

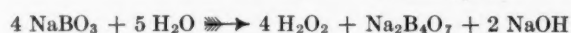
Decomposition is retarded by: salts of magnesium and cadmium.

Atmospheric CO₂ does not cause decomposition of dry sodium perborate. The commercial salt is dried in air without any serious effects. Perborate decomposes at the same rate in distilled or tap water, in the presence of soap, and solutions act the same as solutions containing the equivalent amounts of hydrogen peroxide, borax, and sodium hydroxide.

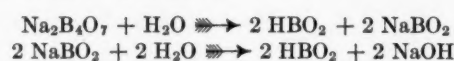
Reactions with Common Chemicals

Sodium perborate is known as a stable product; i. e. it should not lose more than 0.5% of its active oxygen in 30 days if stored in a cool dry place. During the manufacture, a small amount of magnesium silicate is formed which acts as a stabilizer. This stabilizer does not interfere with the later utilization of the oxygen content. Magnesium silicate is the best known stabilizer, although perborate solutions may be stabilized also by solutions of sodium pyrophosphate in salicylic acid; by proteins such as gelatin, glue, keratin, glutenin or albumin, or by acetanilide, especially in dilute solutions. Sodium carbonate and sodium hydroxide slightly accelerate the decomposition, but sodium silicate makes a solution of perborate in hard water practically stable.

In aqueous solution, sodium perborate slowly dissociates to form hydrogen peroxide, borax, and sodium hydroxide according to the equation:



The borax then further dissociates to sodium metaborate, which in turn in dilute solutions gives sodium hydroxide and boric acid:



The dilution and temperature of the solution determine the completeness of the latter reaction. Aqueous solutions of perborate react with calcium, magnesium,

or zinc salts to form hydrated borates containing active oxygen according to the following:

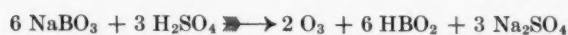


In reactions with copper, nickel, lead and iron salts, very unstable compounds are formed.

In dilute sulfuric acid sodium perborate reacts to form hydrogen peroxide. In a 50% solution of sulfuric, hydrogen peroxide is formed and boric acid is precipitated:



In concentrated sulfuric acid, (ozone) is formed:



Chlorine is liberated from hydrochloric acid by the oxidizing action of the perborate solution.



Iodine is liberated from iodides and bromine from bromides, in slightly acid perborate solutions.



Oxides of lead, manganese, cobalt, mercury, etc. are reduced by acid solutions of perborate.



Titanium sulfate in dilute acid solutions of sodium perborate gives yellow to amber colored solutions of pertitanic acid.



Chromic acid or alkali chromates with acid produce blue chromium peroxide.



Both of the above reactions are very sensitive color tests for available oxygen compounds.

Acid solutions of sodium perborate, percarbonate and hydrogen peroxide all give the blue chromium peroxide reaction with chrome alum. Ammonium sulfide is oxidized with the formation of heat. With mercurous nitrate, perborate gives a precipitate soluble in excess; mercury is precipitated when this solution is warmed. Mercuric chloride gives a reddish-yellow or brown precipitate containing free mercury. Cupric sulfate gives a yellowish-green precipitate which is soon decomposed. Cobalt nitrate also gives a precipitate which is soon decomposed with the liberation of oxygen. Ferrous salts are converted to ferric salts. Palladium tetrachloride gives oxygen with perborate solutions; auric chloride furnishes brown gold in alkaline solution.

Morphine hydrochloride gives a colorless acidular precipitate which soon dissolves with the evolution of oxygen. Quinine sulfate and strychnine nitrate in perborate solutions also gives precipitates, white in color.

Sodium perborate is very useful wherever it is desirable to have on hand an active and easily available oxidizing agent. It may be stored with safety and handled with ease, and its solutions are readily controlled to give proper oxidizing results. In plant work the use of perborate rarely calls for special equipment or highly skilled labor.

Growing demand for bright permanent colors has led to the extensive use of sodium perborate for "fixing" reduced vat colors. In this process soluble, reduced vat colors which have been impregnated on the fibers are oxidized or "fixed" to the insoluble or color form. The vat dyeing process produces colors that after proper fixation are extremely resistant to fading by washing or by exposure to light. Fabrics can be vat dyed by printing or dipping in weak dye solutions. Wool is ordinarily treated at a slightly higher temperature than cotton. After the dyeing, the goods receive a final oxidation and usually a hot soap washing.

Bleaching Properties of Perborate

The oxidizing and cleaning action of perborate make it of special value in bleaching. It is used particularly for bleaching and brightening the more delicate finished fabrics and for bleaching raw stocks and yarns. Perborate likewise finds application in the bleaching of delicate cottons, such as laces, and absorbent cotton. Velvet, plush, and certain sorts of finer silks, delicate skeins of linen yarn and the like are bleached with 1% sodium perborate solution which not only bleaches but, thru its alkali borate content, imparts a gloss to the finished product.

The perborate method is perfectly safe for use in bleaching any white silk, whether pure or weighted, and it produces a clear white. Since perborate can be used in connection with soap in the boiling bath, it has been suggested for the bleaching of colored cottons.

A patented process for bleaching tussah silk involves treatment with perborate, followed by hydrogen peroxide and sodium silicate and finally treatment with sodium hyposulfite. In a process patented by the Chemische Fabrik Grunau for bleaching yarn and piece goods on a large scale by means of perborate, the bleach bath is made up from 100 lbs. sodium hydroxide and 50 lbs. of soap or 25 lbs. of Turkey red oil in 2,000 gallons of water. This is mixed with 15 lbs. of sodium perborate and 12 lbs. of aluminum sulfate previously dissolved in a convenient but not excessive quantity of water. This amount of liquor bleaches 2,000 lbs. of cotton yarn.

Perborate solutions have practically no harmful effect on fabrics, even on prolonged exposure. A series of tests showed that after 50 washings of 15 min. each with a 0.5% solution of sodium perborate, cotton fibers lost only 10% in strength. After washing with soap and soda, 50 washings of 5-10 min. duration

with a weak sodium hypochlorite solution (approximately 0.10-0.15%) caused the fibers to lose 27% in strength. A series of 50 washings made with ozone and with a washing agent having no available oxygen caused losses of 40% and 60% in strength, respectively.

Sodium perborate can be used in the peroxide kiers for bleaching textiles, the perborate being mixed with the alkalis employed in the boiling out stages. It also can be used for clearing whites in cotton material dyed with logwood black where bleaching powder would only turn the shade to brown. Goods are padded with a solution containing 3-5 g. of perborate per liter and dried on drums. Chrome dyes are rapidly altered by this treatment, whereas-sulfide and vat dyes are brightened. The action may be increased by the addition of alkaline substances but the solutions then decompose very rapidly. Sodium phosphate (0.1%-0.2%) may be added, since it acts as an alkaline buffer. Perborate is often used to give a light scour to cotton previous to dyeing, and is a useful addition to textile detergents.

Useful for Stain Removal

When added to soap, perborate helps considerably in removing stubborn stains from soiled fabrics. Its oxidizing effect is very useful for cleaning up laundry work. Many combinations of soap, soda ash and perborate are marketed as laundry cleaners under various trade names. Some of these products consist of sodium perborate alone, while others contain a number of ingredients. One of the better known of these combinations contains 20 per cent of sodium perborate, the remainder being borax and sodium phosphate. Others contain 10 per cent of perborate with varying amounts of soap, soda ash, sodium silicate and water.

Sodium perborate is advantageously used in certain electroplating processes to assist in producing smooth pleasing plated surfaces. In the sodium stannate bath addition of about 1/20 of an ounce of perborate per gallon of plating solution helps produce the desired white tin plate. Grey plate is prevented by the oxidation of small amounts of undesirable sodium stannite. The alkali borate formed by the decomposition of perborate is a useful buffer salt. In nickel plating solutions perborate stops hydrogen pitting and allows higher current densities, thus speeding up production. These results can be secured by the use of as little as 1/20 to 1/50 ounce of perborate per gallon of bath. The perborate should be dissolved in water and made neutral to phenolphthalein with hydrochloric or acetic acid before addition to the plating bath. In sulfate zinc baths the use of perborate produces pleasing white zinc plate. The perborate should be neutralized and added in the same strength as for the nickel bath. A plating solution containing 1/20 ounce of perborate per gallon has about the same percentage of available oxygen as a solution containing 0.27 to 0.81 cc. of 100 vol. hydrogen peroxide.

Perborate, because of its antiseptic properties, finds considerable application in medicine and dentistry. For ease of application, perborate is sometimes used in the form of a solution. These solutions are usually in strengths of two per cent and greater, the two per cent solution being equivalent in germicidal activity to a solution containing 0.4 per cent by weight of hydrogen peroxide. Boric acid and the sodium borates are used to restrain the growth of putrefactive organisms rather than for true disinfection. Perborate is a specific for Vincent's Angina (trench mouth); many stubborn cases yield to continued treatment. For mouth washes it has the advantage over hydrogen peroxide of being alkaline rather than acid. Perborate is employed in tooth powders for whitening the teeth. One formula for oxygenated tooth powder contains approximately 2.5 per cent of perborate and 7.5 per cent of Castile soap powder. The remainder is largely prepared chalk and precipitated chalk, with small amounts of thymol, eucalyptol, geranol and saccharin.

Many cosmetics contain perborate because of its bleaching or whitening action and its beneficial effects upon skin and hair. Soaps for softening and bleaching the skin, for cleansing the hands, for shampooing and bleaching of hair, utilize the active oxidizing power of perborate. A representative preparation for the hands is perborate, soda, and pumice stone. For shampooing and bleaching white hair, a mixture containing equal parts of soap powder and perborate gives excellent results. Perborate has remarkable properties as a deodorant and will remove and prevent all odors of perspiration for some time.

Other Miscellaneous Uses

Perborate possesses a large number of other commercial applications based on its effective oxidizing action, including the recovery of soluble starch, the glossing of starch used for ironing, in rubber mixtures for oxidizing lead sulfide to prevent dark discoloration, as an excellent oxidizing agent in organic chemical operations if dilution, heat, and (pH of the solution) are properly regulated. It may be used for the production of diacyl perborates and to determine the bile pigment in urine. It is an excellent bleach for almond paste. Another small application is in oxygenated baths in which the active oxygen of the perborate is liberated by a catalyst. Typical catalysts include manganoborate, colloidal manganese peroxide, saponin, colloidal iron compounds, dried blood, heavy metal salts with gum arabic, tannin, permanganate, bisulfate and others. The presence of an insoluble salt such as gypsum or calcium borate is necessary for the complete gasification of the bath. A special commercial oxygen bath contains haematogen as the catalyst. Perborate is a very useful antichlor. When hypochlorite has been used for any purpose the addition of perborate will prevent further bleaching.

Plant Management

A Department

Devoted to the Business Problems of Chemical-Process Production

Materials and Markets

PLANTS are no longer located haphazardly, yet a surprisingly large number are still operating at geographical points which were undoubtedly advantageous twenty, or forty years ago, but which are now seriously handicapped by shifts in population, exhaustion of nearby raw materials, removal of consuming industries to other sections, changes in the products manufactured or the raw commodities employed in manufacturing operations, and by excessive power costs. As time goes on these handicaps will be aggravated, possibly, by higher freight rates and certainly, by a further gradual downward trend in selling prices. It looks very like an economic squeeze play.

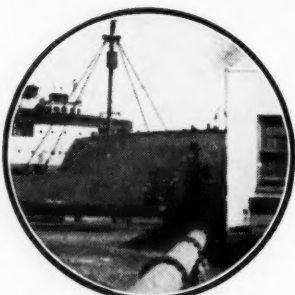
TRANSPORTATION charges are in many instances one-third the entire cost of industrial chemicals. This includes of course inbound and outbound charges. With the long-term railroad outlook rather dark, it is very possible that the future will witness a reversal of the former downward trend in freight rates. On the other hand, labor in chemical industry is being eliminated rapidly in favor of mechanical handling. Tremendously large plants, so impressive in an airplane photograph, will, in many cases, be at serious disadvantage in active competition with a group of relatively small compact units scientifically placed, either close to consuming centers, or near raw materials, whichever proves to be the most economical.

VERY definitely the chemical industry is committed more and more by the actions of its leading companies to the policy of what might be termed "successive production."

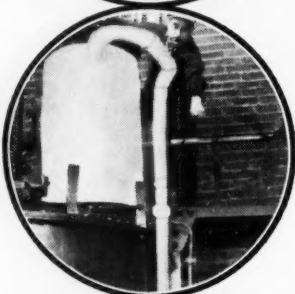
ALKALI developments on the Pacific Coast, the erection of a new bichromate plant in the Middle West, the projected alkali plant on the Gulf Coast and the aluminum chloride plant in close proximity to the oil centers of Texas are indicative of the trend of decentralization of industry from the old centers in the East toward the South and West. Inland water transportation will prove to be a very decisive factor in the creation in the near future of a greatly enlarged chemical industry in the Middle West.

IT REQUIRES Spartan courage to think of revamping production now. On the other hand, building costs are extremely low. There appears to be very little choice in the matter. If a company finds, after a frank analysis of its location problem, that it is in an unsound position then it had better accept the inevitable and plan accordingly. Smaller plants have many advantages. Standard erection units, cheaper and quicker to erect may be used, changes in manufacturing processes may be more easily and economically corrected, standard, rather than specially designed equipment, may be employed more frequently, freight costs will be lower, customers served quicker and more efficiently, and competition met with better chances of success.

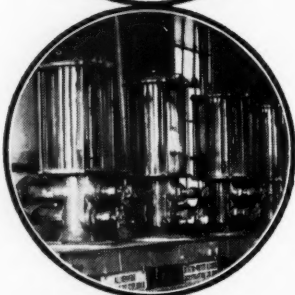
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Filling room for drum shipments of solvent chemicals.



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COLLODION U. S. P.

Formula:

Pyroxylin.....	40 Gm.
Ether.....	750 mls
Alcohol.....	250 mls

Total.....1,000 mls

COLLODION FLEXIBLE U. S. P.

Formula:

Collodion.....	950 Gm.
Camphor.....	20 Gm.
Castor Oil.....	30 Gm.

Total.....1,000 Gm.

PHOTO COLLODION

Standard 2½ oz. Solution

Standard ¼ oz. Thinner

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Containers:

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Ethyl Chloro Carbonate. Ether

Technological Unemployment

Analyzed

By The Chemical Engineers*

THE subject has been so general a subject, and the difficulty of giving "Yes" and "No" answers to questions has been so great, that this report is our best general summary of the many often conflicting opinions. A statement in this report must be considered as being the opinion of the majority reporting, but wherever there has been a point expressed that is not apparently concurred in by the majority, specific mention is made of that fact.

Technological unemployment was deemed inadequate as the title for the subject. Technological advance was believed to be a much better title. Emphasis is placed on the fact that technological processes frequently involve the increase of employment by the addition of new, before-unheard of jobs. The effect, therefore, on employment, whether to increase or decrease it, is the net result of the jobs made by technological advance and those done away with by technological advance.

The two definitions of technological unemployment given in Mr. Wallace's memoranda of June 20th and September 1st, each had its advocates, but the majority decision lies with the acceptance of the definition of September 1st, as that does not involve management. The definition given in the first memoranda was as follows:

"Technological unemployment is that caused by displacement of men by machinery, new processes, the development of new products, and improved management. Technological unemployment is not confined to manufacturing industries alone. It includes joblessness caused by changes in methods of distribution and transportation of goods, as well as by changes in styles and other consuming habits of the public."

The definition given in the September memoranda and the one that is more acceptable was:

"Technological Unemployment means any displacement of workers due to technological advance and to the increased use of the results of technological

A Report by

John V. N. Dorr
Chairman

William H. Gesell

Martin H. Ittner

Walter S. Landis

C. E. Kenneth Mees

Frederic W. Willard

Crosby Field
Secretary

advance—due to the increased use of constantly improving mechanism or mechanical and chemical processes or physical methods or materials or ways of producing and applying power—in connection with any occupation and in in any field of employment."

The effect of technological unemployment on the present large total unemployment problem was believed to be very slight, as the majority of the Committee believe that there was substantially as much technological

unemployment in the boom years of 1928-1929, as there was in the depression period of 1930-1931.

The principal cause of the present depression is believed to be an out of balance condition existing between credit and income. Various terms were used to describe this, such as "over-buying in the previous boom period," "over-capitalization of futures," "over-building of plants," "over-doing combining of plants, or mergers," (the implication being that many of these were simply for the benefit of the promoters), and "too much leisure amongst workers." All of these ills, of course, occurred during the last boom period, and therefore, all of the troubles of the present depression period originate in the last previous boom period.

A very interesting study of the relation between credits and price levels, undertaken by the Royal Bank of Canada, Montreal, was referred to. Briefly, price levels follow the general rule that when credit grows at the same rate as the increase in volume of production and trade, they are maintained constant and there are no business cycles, and no booms or depressions. In other words, our entire difficulty is a matter of misuse of credit, both public, corporation, and even private.

Before proceeding to the detailed answering of the questions, a few more points of general broad interest it is believed should be mentioned. Attention was also invited on the part of one of our members to the

*Report made at Atlantic City Convention, A. I. Ch. E.



Bichromate of Soda
Bichromate of Potash
Chromic Acid
Oxalic Acid



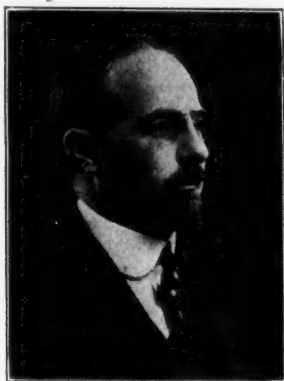
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following life cycle of an industry, which it is believed in general is worthy of inclusion in this report because it shows how Technological Advance tends to increase and to decrease jobs at various periods of the life cycle of an industry. A technological process, such as a chemical process, is invented and a company formed to produce the product. A very small plant starts in this, the pioneer stage of an industry. If the process be successful, then this small plant will continue to increase and other plants will be built. The result is that in the localities where these plants are built, there is a great increase in technological employment, even though the advent of the new product is beginning to cause the public to reduce the



J. V. N. DORR
Chairman

amount purchased of other products, and thus decrease employment in some other localities or in some other industries.

The third stage of this industry may be called consolidation and stabilization. This is the period in which automatic machinery is developed to produce the product at less cost. It is the period in which consolidations and mergers take place. It is further the period in which the number of employees decreases due to true technological unemployment.

The fourth stage is that of disintegration, in which the industry is losing place to other newly arriving industries, and during which period men continue to be thrown out of work.

Another point brought out by one of the letters is that there is a vast proportion of our industries whose sole function is to produce the tools

that other industries use for so-called technological unemployment. This technological unemployment may be a case of putting in machine tools, or may be a matter of expanding of industries by moving into new

localities. Any expansion is sure to have an element of technological unemployment for other industries involved therein. Because of this the following industries are examples of many which may be called industries creating technological unemployment: machine tool shops, boiler shops, chemical laboratories, construction equipment companies, and all new construction enterprises.

Another of the members of the Committee invited attention to the fact that continued prosperity de-



CROSBY FIELD
Secretary

pends upon a balance between the many factors involved, and that some business unbalance has resulted from taking popular slogans too seriously. One of these was the familiar platitude that "We need more production." It was true to some degree during the war but some industries that put too much faith in it and took it too literally, suffered so much from overproduction that they have not yet recovered, notably the agricultural chemical, and sugar industries, and there are others.

Another slogan of the same kind has become a fetish in manufacturing industries and has exerted a profound influence on employment and unemployment. It is the demand for "Standardization" in manufacture so that the maximum amount of work can be done by the minimum amount of labor and so that labor may operate with the minimum of thinking. The

Questions the Committee Was Asked

The following definition has been adopted by the General Committee for the purposes of its work:*

"Technological Unemployment means any displacement of workers due to technological advance and to the increased use of the results of technological advance—due to the increased use of constantly improving mechanism or mechanical and chemical processes or physical methods or materials or ways of producing and applying power—in connection with any occupation and in any field of employment."

Have you any comments as to this definition?

General Premises and Questions

1 Technological advance is a fact and under any economic system, of free competition at least, it would be impossible to control it even if it were advisable so to do.

2 Technological advance affects the opportunities for employment; this effect may result in either a net increase in or decrease of the total number of jobs available.*

3 Regardless of whether technological advance increases or decreases the total number of jobs available, men are displaced for varying periods of time; they do suffer an economic loss, either temporarily or permanently.

4 The problem is not to interfere with technological advance but to devise ways and means of constraining any social and economic disadvantages associated therewith.

5 To adequately understand and treat with any disadvantages associated with technological advance, requires the collection of a large body of reliable and authoritative data. To be truly useful and helpful, these data must be fairly interpreted and fearlessly published. They should be used as a basis for predicting technical changes whether sweeping in character and influence, or limited as to scope and effect.

6 Technological advance may be divided into two general classifications:—the one sweeping, the other limited.

7 Sweeping technical advances are those of such character, influence and spread (both industrially and geographically) as to affect a large area of employment (the number and kind of jobs) and of such magnitude as may require a realignment of national, social and economic policies. As an illustration, the extent and degree to which chemical processes have permeated industrial and commercial activities.

**Appointed by Department of Labor*

8 Sweeping technical advances suggest such questions as the following:

- a Do they collectively increase or decrease the total number of jobs available?

This question suggests a line of study directed towards striking a balance between the number of jobs produced and the number eliminated by technological advance.

- b Can sufficient reliable data be secured to predict such sweeping changes in time to give all concerned an opportunity to govern themselves accordingly?

- c Assuming reliable data can be obtained and wise predictions can be made, would it be advisable, considering the economic and social interests of society, to make such predictions?

9 Limited technical advances are those which affect a relatively small number of workers at any given time or place or that affect only one industry or major subdivision thereof or involve a small geographical area. As an illustration, the installation of a cigar-making machine.

10 Although the influence of the limited technical change is felt in relatively small industrial, geographical or occupational areas, yet it has as serious an effect upon the displaced worker as does a sweeping change. Therefore it requires concentrated and prompt treatment.

11 The productivity reports of the Bureau of Labor Statistics, supplemented by its wage, hours and other studies, forms an excellent foundation upon which to base the necessary studies of sweeping technical changes. They disclose the industries wherein marked increases in productivity per man-hour have occurred, which obviously implies something very significant has taken place, and in all probability technical changes.

- a Should not the Productivity Reports be made the point of departure for almost all the work to be done concerning sweeping technical changes?

- b With the Productivity Reports serving as indicators of sweeping technical changes, what technique can be based thereon whereby it can be ascertained if such changes result in a net increase or decrease in jobs available?

12 The technique for dealing with limited changes should, in broad outline, consist of determining on the part of the Department of Labor, with the co-operation of employers and workers, the following information:

- a The date, as far in advance as possible, when a given change is to occur.

- b The number of workers involved.

exactions of labor, or fear of the exactions of labor, has been instrumental to some degree in the spread of the standardization of manufacturing methods. The manufacturer in a given industry who is first to standardize his products and his manufacturing methods, gets



Dr. John C. Olsen 1931 head of the American Institute of Chemical Engineers. He is succeeded in the chair by the Chairman of the Technological Unemployment Committee, Dr. J. V. N. Dorr

a temporary advantage. He increases production, uses less labor per manufactured unit and lessens costs. He forces his competitors to standardize, after which he loses any advantage he may have had at first. The result is that general production increases until it eventually exceeds the demand. The public may derive some benefit from standardization but mergers frequently take this benefit away.

The result of standardization is some net unemployment and certainly a lowering in the grade of labor. This phase of the matter is not of public benefit.

Detailed answers to Mr. Wallace's questions are attempted hereinbelow.

Memorandum of September 1, 1931:

Definition approved with the comment that Technological Advance should consider the increase in employment as well as the decrease, the net result being the technological effect on employment.

The Committee on the whole was in full accord with the general premises and questions Nos. 1 to 10 inclusive.

With respect to No. 11, the suggestion was made that the productivity reports of industries producing tools, etc., could be used in

- c Complete occupational history, including age and earnings, of each worker to be affected.

- d Method of notifying all concerned, as far in advance as possible, of the date upon which the change is to take place.

- e What is the best method for handling such a line of action?

- f How is the Department of Labor to ascertain when technical changes of a limited type are to take place?

- g Would it be advisable for the Department of Labor to set up machinery for determining as far as possible, when such changes are to occur?

- h And further, through an educational program of a suitable character, arouse the sense of responsibility of employers, so they when only a very few workers are involved, will adequately handle the situation, sending the occupational records to the Department to be added to the accumulative file.

13 A true understanding of the net influence of technological advance upon the opportunities for employment, that is, whether the total number of jobs available has been increased or decreased thereby, cannot be obtained by any effort to assemble data on what has occurred in the past. Sufficient reliable data for the painting of such an accurate picture are not available and in all probability are unobtainable. It would be a waste of time, effort and money to endeavor to obtain anything like an adequate picture of the influences of technological advance by any such process.

It is not very important to know whether over the last ten or twenty years the total number of jobs available has increased or decreased, but it is exceedingly important to know, as far in advance as possible, when a displacement is to occur and to have ways and means available for at once providing employment for the worker so he will not suffer economic and social loss. Therefore, in dealing with technological advance, the emphasis should be placed upon effectively aiding the individual involved at the time of displacement to the end that the assets he possesses are not dissipated. If this be done for all individuals, the best interests of society will be safeguarded also.

A method of approach such as suggested, for protecting the individual when fully developed will result in the accumulation of an infinite quantity of reliable and authoritative data, which will in the course of a few years, permit of painting an accurate picture of the net and true effect of technological advance upon the sum total of employment. Furthermore, the accumulated data will enable the preparation of accurate trend curves which may be extended from year

to year, and as may be desirable, projected into the future for the purpose of predicting what may happen.

a Is the foregoing premise sound and should it be made the foundation for dealing with technological unemployment?

b Should not an important phase of any program designed to throw light upon the influence of technological advance on the opportunities for employment, be directly centered upon obtaining occupational histories of all workers before displacement, with a follow thru to determine what happens afterwards for a moderate number of years, say five?

14 In the last analysis, the problem of technological unemployment consists of developing ways and means of accomplishing the following results:

a Reducing to the irreducible minimum the lag between displacement and re-employment.

This requires an execution of the program laid down in (12) above, before displacement occurs, supplemented by a training and placement plan which is to be developed by another subcommittee.

b Reducing the waste of the assets of the worker (experience and skill).

This involves complete occupational histories; transfer of skill; scientific analyses; training and placement.

c Eliminate economic loss to the worker.

This involves ample notification of date of displacement, the responsibility of the employer, and the factors (a) and (b) above.

d Lessening the shock to society of the economic and social consequences of technological unemployment.

This involves predicting, on the basis of fact, sweeping changes, plans for dealing with them, and an adequate and timely handling of the factors (a), (b) and (c) above.

Suggestions and specific plans for dealing with all of the foregoing are earnestly desired.

15 Occupation. Technological advance undoubtedly results in occupational shifts and the gradual disappearance of some occupations. Obviously no adequate understanding and treatment of the phenomenon can obtain without a comprehensive and intensive study of what is happening to occupations. There is very little data available.

a Should the Department of Labor enter upon a thorough-going continuous study of occupations from the point of view of determining what is happening, not only because of the bearing upon technological unemployment but for many other important reasons?

b Should the Census of Manufactures regularly show the number engaged

general to predict the productivity reports in those industries into which the machine tools enter.

No. 12 was felt to be a fine ideal, but very difficult of obtainment for the reason that it is so difficult to judge in advance the practica-



Frederic J. Le Maistre who was again elected executive secretary at the recent Atlantic City Convention

bility of any certain Technological Advance. Every new thing is resisted, and both the old and the new shall survive together for many years. The field of usefulness of the old having been restricted to a degree by the introduction of the new, but frequently proving itself impregnable in many fields. In short, No. 12 was deemed impracticable.

With respect to 13(a), it is not believed that the premise is sound.

Insofar as a study is concerned, 13(b) would be interesting and probably could be put into effect in a few cases as samples.

Insofar as Paragraph 14 is concerned, it is believed that a discharge payment to assist in eliminating the economic loss to the worker, called for in 14(c), would be something practical that could be put into effect. Insofar as the other sub-paragraphs are concerned, it was felt that this involved entirely too great a task.

The Committee believes in answering "Yes" to the whole of Paragraph 15, leaving the technique largely to the experts who would be doubtlessly employed by the Department of Labor.

Insofar as Paragraph 16 is concerned, the Committee is in accord.

Insofar as Paragraph 17 is concerned, the Committee is in accord with sub-paragraph (a). Insofar as sub-paragraph (b) is concerned, a weight unit is believed sufficient. The use of horsepower as called for by sub-

in each occupation or profession, classified by industries and major subdivisions thereof, as was partially done in 1910?

c What should be the technique for making occupational studies?

16 Studies in the realm of technological unemployment are of recent origin,—those thus far made are of little value. For the sake of making all studies, by whatever agency made, truly useful and contribute on a uniform basis to the sum total of knowledge and understanding of the subject, should not the Department of Labor, as soon as it has developed a program, call together representatives of all agencies which have or may make such studies, for the purpose of developing the following:

a Common terminology.

b Common or uniform technique.

c Free interchange of findings.

d Division of field insofar as practicable and advisable to eliminate duplication.

e Make Department of Labor depository for all findings—to be included in an annual publication on the subject by the Department for the common good and the information of the public.

17 There should be established standard units of measurement for the purposes of comparison and for other important reasons.

a The unit of measurement of productivity should be actual man-hours and applied wherever practicable.

b There is not available a comparable unit of measurement for commodities or the output of machines. Such units as barrels, pounds, tons and the like are in use, which makes comparison exceedingly difficult.

c Can the number of horsepower required be used as an index of technological advance?

d What other units of measurement can be used as indexes of technological advance?

18 To what degree can the sampling method be safely used in determining the influence of technological advance upon employment?

For instance, a sample study is made on railway A and certain findings obtained. Would it be wise or correct to apply some ratio to the findings and conclude that the result represents the national situation?

a If a sampling method is advisable, what specifications should be adhered to, that is, should the specifications be on the basis of:

1 A certain per cent of the number of employees engaged in an industry or a line of commerce or trade, and if so, what per cent of the total would be an adequate sample?

- 2 A certain per cent of the value of the product or total sales, and if so, what per cent of the total would be an adequate sample?
- 3 A certain per cent of the number of establishments, and if so, what per cent of the total would be an adequate sample?
- 4 In general, what geographical spread would be considered adequate. For instance, automobile manufacture is largely centered in Michigan; flour in Minneapolis; heavy chemicals in Niagara Falls. Would a sample taken only in such centers be adequate?
- 19 In what directions could the follow-

paragraph (c) is not believed to be a true index of technological advance, because of the various efficiencies of the horsepower involved. The Committee had no recommendation to make insofar as sub-paragraph (d) was concerned.

The Committee believed that insofar as Paragraph 18 was concerned, it was a matter that could be ascertained only by actual study, and that the sampling method would be found advisable only in certain cases, and in others inadvisable. It was deemed that it involved so many matters of opinion on which only data not yet obtained could prove the effect, that no recommendation on this phase should be made at this time.

The Committee had no further suggestions to make on Paragraphs 19 and 20.

Memorandum of June 20, 1931:

Insofar as the major factors enumerated in this report are concerned, it was not believed that mergers, the change of location of plants, the combining of two or more plants, improved management, or anything else, really had anything to do with technological unemployment. These were felt to be largely matters of credit, finance, and individual management, which do not deserve of themselves the term technological. It was felt that this might well be one result of Technological Advance, but not primarily the cause for technological unemployment.

ing reports of Governmental agencies be so revised as to make them throw more light upon technological unemployment without too much change in their complexion and too great an expenditure of additional time and money:

- a Productivity reports.
- b Wages and Hours reports.
- c Commerce yearbook.
- d Census of Manufactures.
- e Census of Occupations.
- f Some of the reports of the Bureau of Economics of the Department of Agriculture.
- 20 Suggestions and comments on any other phase of the problem of technological unemployment not mentioned in this memorandum will be appreciated.

The Committee felt that no exception can be taken to a study of the broad questions enumerated in this memorandum of Mr. Wallace's, but felt that after this information had been obtained, its value would indeed be very dubious because of the great provocation to make it a matter of still more legislative and governmental bureaucratic control. The general feeling throughout the Committee was that our present ills have been due to the fact that we have all been buying too much for many years, both privately and as corporations, and that this buying has been what might be called construction for future expansion, and on installments or in some other fashion by the use of credit in an ill-controlled fashion.

New Incorporations

- Clement Grassi, chemical compounds—J. J. Hammer, 151 West 40th St., 100 shs com.
- Hektosolve Corp., chemicals—E. Newman, 116 Nassau St., 20,000.
- Metropolitan Alcohol Corp., industrial alcohol—J. M. Gray, Philadelphia, 100 shs com.
- Rhodium Plating Corp., chemicals—E. Zorn, 33 West 42nd St., 10,000.
- Seyopp Chemical Corp.—Feiner & Skutch, 37 Wall St., 100 shs com.
- Agricultural Research Laboratories, Inc., Princeton, scientific investigations—Vandewater & Manser, Princeton, 125,000.
- Columbia Textile Chemical Co., Rutherford, chemicals—Jack G. Goldberg, Jersey City, 2,500 shs com.
- March Chemical Co., Metuchen, manufacturing chemicals—Ely & Ely, Rutherford, 100,000.
- The Soley Corp., Plainfield, drugs, paints, chemicals—Alexander Appel, New York City, 10,000.
- Unique Chemical Co. Inc., Newark, manufacturing chemicals—Philip S. Liberman, Newark, 500 shs com.
- The Chemtex Corp., Wilmington, textiles, drugs, chemicals—Corp. Fiscal Company, 2,000 shs com.
- Downey Laboratories, Inc., Carnegie, Pa., drugs, chemicals—Capital Rust Co., 50,000.
- Industrial Chemical Products Corp., Philadelphia, Pa., soap, soap powders, insect destroyers—U. S. Corp. Co., 200 shs com.
- National Pine Tree Products Corp., New York City, soaps, toilet articles, medical preparations, chemicals, drugs, perfumes—United States Corp. Co., 1,200,000 shs com.

Reckitts (New York) Ltd., Brooklyn, N. Y., starches, dyes, washing blue, metal polishes—U. S. Corp. Co., 250 shs com.

Equipment Bulletins

Glascote Co., 20,900 St. Clair Ave., Euclid, Ohio, issued new booklet profusely illustrated describing the complete Glascote line of non-corrosive equipment. Specifications are included.

Reading-Pratt & Cady Co., Bridgeport, issued 16 page booklet giving complete description of new Lubrotite Gate Valve with its uses. This valve differs from ordinary gate valve in that it has a unique duct system for introducing a lubricant-seal between seating surfaces. This results in tight seating even though seats of valve become injured in service, retards corrosion, and gives easier valve operation.

Schutte & Koerting Co., Philadelphia. Bulletin 12-h-supplement 1, describing the S. K. Polyplate Heat Exchanger, and Bulletin No. 6-F, Supplement 1, describing the S. K. Rotameter, a device for measuring rate of flow in a pipe line.

W. A. Taylor & Co., 872 Linden Ave., Baltimore. "Modern pH and Chlorine Control". A 50 page booklet complete with illustrations giving in detail many phases of modern laboratory control work. A very valuable contribution and should be in the hands of every chemist.

American Gum Importers' Association, re-elected Dec. 8 entire board of governors. The board E. H. Patterson, G. W. S. Patterson, Inc.; O. G. Innes, Innes & Co.; Charles E. Walden, Paterson, Boardman & Knapp; H. E. Hendrickson, S. Winterbourne & Co., and A. J. Wittenberg, of Stroock & Wittenberg, Inc.

The Industry's Bookshelf

Measures of Exports of the United States, by Dudley J. Cowden, 123 pages, published by Columbia University Press, New York, \$2.00.

Export indices calculated to determine the most representative type to serve as useful indicators.

Qualitative Chemical Analysis, by Louis J. Curtman, 539 pp., Macmillan, New York, \$3.75.

A textbook that covers thoroughly the elementary approach to the theoretical principles, special stress being placed on the theory of ionization, chemical equilibrium, solubility product, complex formation and oxidation-reduction.

Quantitative Chemical Analysis, by Henry P. Talbot, 253 pp. Macmillan, New York, \$2.50.

A revised seventh edition of this much-used textbook, with many important changes and additions.

Introductory College Chemistry, by Harry N. Holmes, 550 pp. Macmillan, New York, \$3.25.

A second edition of this college text, brought up to date to include the newest industrial processes, such as the hydrogenation of petroleum and the newer methods of making industrial alcohols.

The Chemistry of Laundry Materials, by D. N. Jackman, 246 p., published by Longmans, N. Y., \$2.50.

A practical book designed for those in charge of laundry operations giving a very valuable insight into the whys and wherefores of many of the operations employed. Deals thoroughly with the primary materials most commonly used and also devotes considerable space to special problems. Two chapters are devoted to a brief summary of elementary chemistry.

American Public Finance and Taxation, by William J. Shultz, 635 p., published by Prentice-Hall, N. Y., \$5.

While primarily designed as an advanced textbook for college students in public finance and taxation the book has a direct appeal to the business executive who would keep abreast of one of the most pressing problems of the present moment—and one that will cost everyone money this year—the subject of taxes.

Principles of Selling, by H. K. Nixon, 330 p., published by McGraw-Hill, N. Y., \$2.50.

More than the merely conventional pep talk so common in works of this sort. Really a serious discussion of the basic nine principles involved in the art of selling goods.

Credit and Its Uses, by William A. Prendergast and William H. Steiner, revised edition, 648 pages, published by D. Appleton & Co., N. Y. \$4.00.

Though based to some extent on the earlier book of the same title, this is a much larger and more important work, covering both the theory and technique of credit and collection work in any form of mercantile business.

The Correspondence of Jefferson and Du Pont de Nemours, edited by Gilbert Chinard, 417 pages, published by Johns Hopkins Press, Baltimore. \$7.50.

The letters that passed between Thomas Jefferson, president of the United States, and Pierre Samuel de Pont de Nemours, French philosopher, economist and statesman, who came to the United States during his last years, and helped his son found the powder works which has become one of the country's largest industrial organizations.

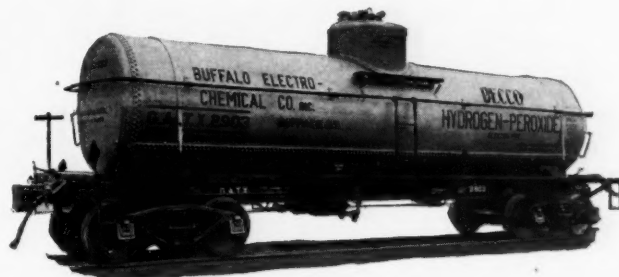
Helium In Demand Abroad

Helium exports during last three years total 310,760 cu. ft. and permission to export more than 20,300,000 cu. ft. of helium was granted by Bureau of Mines on behalf of Department of Commerce. Actual shipments were only a little over 300,000 cu. ft. Exports were almost entirely for laboratory and research use.

Jan. '32: XXX, 1

Hydrogen Peroxide in Tanks

Through co-operative efforts of the Buffalo Electro-Chemical Co., Buffalo, and General American Tank Car, the first shipments of hydrogen peroxide in tank car lots recently went forward to a large textile manufacturing concern. Compared with glass carboys, the tank car affords real economies that naturally reflect on the price of the commodities shipped. Glass carboys protected by



One outstanding development in 1931 transportation improvements was the production of special tank car for transporting 100 vol. hydrogen peroxide

the usual means by being packed in excelsior or straw in a strong wooden carrying case weigh approximately two-thirds of the weight of the material shipped.

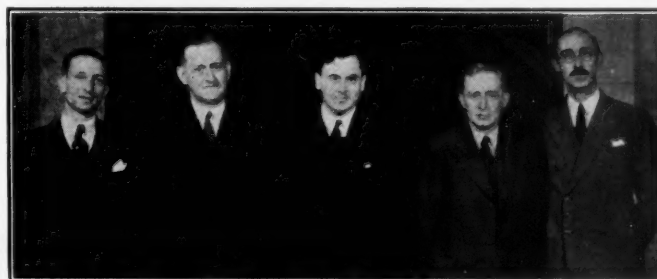
One tank car is now in regular service and others are being built. Each car has a capacity of 8,000 gallons or 75,000 pounds of 100 vol. hydrogen peroxide.

Methods of Production

Since the adoption of the electrolytic method for manufacturing hydrogen peroxide in this country the production cost of hydrogen peroxide has been not only considerably lowered but the expense in shipping was likewise affected for reason that by the electrolytic method hydrogen peroxide solutions can be gained directly from the still in concentrations of 100 volume and over. More plainly speaking, by the old method of manufacturing it was almost impossible to manufacture solutions of more than 20 volume, whereas as stated above, today solutions of 100 volume or stronger can be manufactured. Thus the shipper is shipping hydrogen peroxide instead of water and one can readily understand what a reflection this exercises on price when the present transportation rates are taken into consideration.

The commercial development of hydrogen peroxide began with the persulfuric acid process in Austria in 1908, and from this, grew the persulfate process. This was a relatively weak solution, and it was not until 1927 that concentrated solutions were manufactured in the laboratories of Pietzsch and Adolph in Munich, Germany.

Acetylene Association Officers

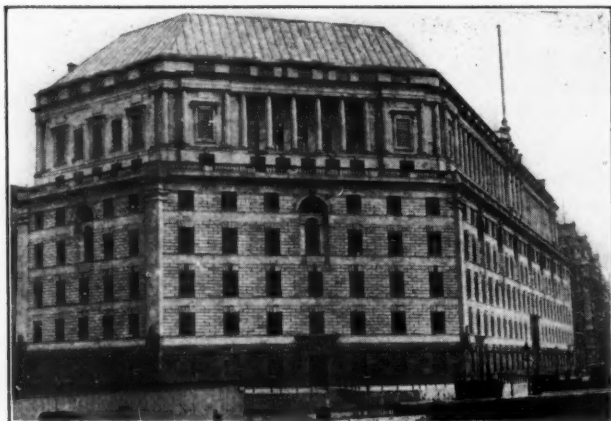


Newly Elected Officers of the I. A. A. Left to right, H. F. Reinhard, secretary; E. J. Hayden, vice-president; W. C. Keeley, Jr., president; W. D. Flannery, retiring president; and W. C. Colter, treasurer

Foreign News

Emergency tariffs on imports into Great Britain were announced Dec. 17 by the president of the Board of Trade for third group of articles to be taken up under the abnormal imports act.

This announcement imposes duties of 50 per cent ad valorem for period of six months on a large number of articles, including the following chemicals: alumina sulfate, ammonia alum, citric acid, cream of tartar, lithopone, potash alum, sal ammoniac, soda alum, tartaric acid.



Headquarters of British Chemical Industry, I. C. I. general offices, Grosvenor Road, London. I. C. I. secured British Alizarine Co. in 1931

Despite some feeble opposition from the greatly demoralized occupants of the Labor benches the renewal of the Dyestuffs Act was assured when an amendment to the Continuance Bill for Expiring Laws specifically exempting the Dyestuffs Law was overwhelmingly defeated. Thus England has again fortified herself against inroads of foreign dyes, at least for another 12 month period.

Magadi Ceases Production

News of the intention of the I. C. I., to cease production at the plant of their East African subsidiary, Magadi Soda did not come as a complete surprise. At the last annual meeting of Magadi, held in London in May, chairman, Sir Harry McGowan, when reviewing the prospects of the concern, stressed falling off in the Chinese, Indian, and Japanese markets, and indicated that unless some modifications could be obtained in the conditions of the leases under which the Company operated, the whole position of the concern would have to be reconsidered. The financial aspects of this matter are explained in detail in the financial section.

Hydrogenation In Abeyance

Imperial Chemical Industries issued a statement during the past month that while convinced that hydrogenation is a commercial proposition, they will not put any of the company's money into the industry. In the event of any commercial body being interested in the oil from coal industry, I. C. I., would be prepared to place at its disposal the results of its lengthy research and experience in the hydrogenation process.

France's nitrate muddle became more complicated in December. M. Tardieu's attempt to protect French fertilizer industry in conformity with government's aim of building it up to the point where France may be entirely independent of foreign sources of supply back-fired slightly. Import quotas were set for 1931 and made very low purposely. By September these quotas were filled and imports ceased, following which government pro-

posed that a purchasing company be organized to conduct all business with the importers.

Nitrates were to be bought at the world market price of fr. 80 a 100 kilograms and sold in turn to the French industry at fr. 95, the difference of fr. 15 being devoted to subsidizing a large factory building program to make France self-sufficient in nitrogen products.

Major foreign suppliers, Germany, Chile, United States and Norway, objected to subsidizing French producers. Foreign interests insisted government had the right to fix import taxes as high as it wished, but not to give such a hand-out to French private interests.

Germany has evidently withdrawn from the agreement of importing combines not to export to France for M. Tardieu announced that an accord under which France would purchase nitrates from Germany would be signed immediately.

It was stated the French Comptoir de l'Azote would buy 150,000 tons of nitrate from the German I. G. Farben Industrie between Jan. 20 and Sept. 1, next, paying fr. 83 a hundred kilograms and selling to French farmers fr. 95, contributing fr. 12 profit to a trust fund to subsidize the French nitrate industry.

Much opposition has developed to this plan. Many in France see grave danger in such a contract with the German industry. In time of war, France would find her old sources of supply—from Chile, Norway and America alienated.

In German Chemical Circles

I. G. report for third quarter year indicated little change in sales of dyes, declines in European markets being offset by increases in overseas trade.

Fertilizer exports were better than in the same period last year, while domestic sales were adversely affected by poor agricultural credit situation. Trade in chemicals remained fairly satisfactory, photographic materials showing seasonal improvement during quarter.

Ruhr-Chemie and I. G. have together founded new company, Chemische Fabrik-Holtien, to use remaining contents of coke-oven gas after synthesis of nitrogen, mainly to extract an ethylene product, which will serve as a solvent for lacquers, etc.

Deutsche Gold und Silber Scheideanstalt und Verein für Chemische Industrie A. G., both of Frankfort-on-Main, are to amalgamate. Terms of fusion provide for entire share capital of Chemische Verein to be taken over by Scheideanstalt on basis of one Scheideanstalt share for each two Verein shares.

Development of German foreign trade in wood-distillation products has been marked by severe competition with American trade in Europe. The union of German wood-distillation industry with synthetic methanol manufacturers strengthened position of the German European trade.

Method for manufacture of anhydrous zinc chloride is described briefly by Dr. Wurster of Ludwigshafen in "Chemiker Zeitung." In this method, phosgene, or a mixture of carbon monoxide and chlorine, is passed into a mixture of zinc-oxide-containing material and molten zinc chloride. The reaction is effected in an iron vessel provided with an agitator.

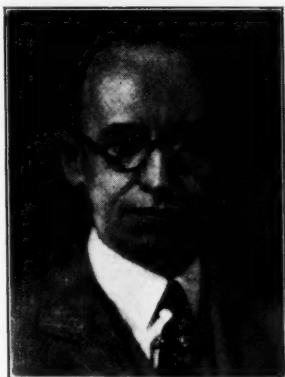
An order by the British Treasury, reported to the Commerce Department by Trade Commissioner Roger R. Townsend, London, effective from November 17, 1931, to December 31, 1932, exempts dimethyl sulfate, and ethyl abietate, imported into the United Kingdom, from payment of "key industry" duty of 33½% ad valorem.

Same order continues for another year (with the single exception of lactic acid), existing duty exemptions for certain chemicals, due to expire on December 31, 1931. Acid isobutyl allyl barbituric; acid propionic; butyl methyl adipate; calcium gluconate; chinoline (quinoline); diphenyl; diphenyl oxide; germanium oxide; methylene chloride; scandium compounds; sodium ethyl methyl butyl barbiturate; strontium carbonate; and strontium nitrate.

Chemical Facts and Figures

Alcohol Output Declines—New Employment Bureau—Commercial Solvents Wins Suit—Huntington Joins Cyanamid—Conant, Chandler Medalist—Proctor, R & H, Retires

Rendering an account of his stewardship Commissioner Doran found ample proof that policy of limiting the production of industrial alcohol to the actual needs of legitimate industry has proven successful. Early in November leading alcohol producers meeting with Mr. Doran in Washington subscribed to the policy of repeating 1931 quotas for the current year.



Commissioner James M. Doran
Finds alcohol better controlled

The Commissioner's report for the fiscal year ended June 30, 1931 is less voluminous but equally as interesting and instructive as former reports.

"Each industrial alcohol plant is allotted a fixed quota of the total alcohol to be produced, with a provision that only 40 per cent of the total quota for the year can be produced during the first six months of the calendar year, provided that legitimate industries do not require an excess of that quantity.

There has been a substantial decrease during the past fiscal year in the quantity of completely and specially denatured alcohol manufactured and withdrawn for use. The decrease was due largely to the business depression and to better supervision over the manufacture and use of denatured alcohol.

As a result of this decrease, very few companies manufactured their full quota of alcohol with the exception of those where alcohol was a by-product.

The manufacture of synthetic ethyl alcohol from ethylene gas during the past fiscal year has been firmly established on a

commercial basis. It is now a recognized source of industrial alcohol on a large scale. Between six and seven million gallons of alcohol was produced during the past year by this method.

Decline

The decrease of 9,005,540 wine gallons in the quantity of completely denatured alcohol produced during the year is attributable principally to the use of a smaller quantity of completely denatured alcohol as an antifreeze solution in automobile radiators during the past winter due to the moderate weather and to reduced commercial demand generally throughout the year.

During the fiscal year there were produced 166,014,346 proof gallons of alcohol, a decrease of 25,844,996 proof gallons compared with the quantity produced during the preceding year.

This decrease is attributed to the business depression during the year in those industries using alcohol as a raw material, to the Bureau's policy of limiting produc-

tion to actual needs of industry, and to the decrease in the use of denatured alcohol.

There were withdrawn from warehouses on payment of tax 7,398,519 proof gallons of alcohol, a decrease of 851,962 proof gallons compared with the quantity withdrawn tax-paid during the preceding year.

There were withdrawn for tax-free purposes, including withdrawals for denaturation, for export, and for use of the United States, hospitals, laboratories, colleges, and other educational institutions a total of 152,172,186 proof gallons of alcohol, a decrease of 32,588,011 proof gallons compared with the quantity withdrawn tax-free during the preceding year.



Seymour Lowman charged with prohibition enforcement

During the fiscal year there were withdrawn from bond, free of tax, for denaturation 149,303,438 proof gallons of alcohol and rum, against 181,601,420 proof gallons withdrawn for this purpose during the previous fiscal year.

Less Need

There were 86,308,941 wine gallons of denatured alcohol produced during the fiscal year, of which 49,136,200 wine gallons were completely denatured and 37,172,740 wine gallons were specially denatured, compared with 105,787,537 wine gallons of denatured alcohol produced during the previous fiscal year, of which 58,141,740 wine gallons were completely denatured and 47,645,796 wine gallons were specially denatured.

The decrease of 10,473,056 wine gallons in the quantity of specially denatured alcohol produced during the year is due largely to the lessened industrial needs during the year in industries in which specially denatured alcohol is used as a raw material, and also to restrictions imposed to prevent diversion of specially

THE MONTH REVIEWED

- Dec.
- 7 I. C. C. permits rate increases (64).
 - 9 President-elect J. V. N. Dorr, reports to Chemical Engineers on unemployment (49).
 - 13 "Cosach" obtains financial requirements for current nitrate year (64).
 - 16 Alcohol and ethyl acetate prices go higher (73).
 - 17 Great Britain places higher duties on certain chemicals (56).
 - 24 Prof. Conant, Harvard, winner of Chandler Medal (58).
 - 26 France buys German nitrates (56).
 - 28 Secretary Mellon announces tax refund names (58).
 - 29 Commercial Solvents wins infringement suit against Union Solvents (57).
 - 31 W. D. Huntington joins American Cyanamid (60).

denatured alcohol and products made from specially denatured alcohol to illegal purposes . . . "

"Substantial and important results are continuing to be obtained in eliminating weaker formulas from certain lines of industry, thus reducing diversion and assisting the legitimate industry to secure denatured alcohol better adapted to its needs.

Research work is being conducted with the hope of further strengthening the specially denatured alcohol formulas with the view not only of safeguarding the alcohol but also for the purpose of making these formulas more adaptable for use in the arts and industries . . . "

"Operations under permits issued by the bureau were conducted during the fiscal year at 46 industrial alcohol plants, 72 bonded warehouses, and 60 denaturing plants."

Honored

Chandler Medal for achievement in chemical science awarded for 1931 to Prof.



Prof. James B. Conant
Distinguished services are recognized

James Bryant Conant, chairman, division of chemistry, Harvard University. Professor Conant will receive medal in Havemeyer Hall, Columbia, 8.15, Feb. 5.

Successful

Chemical and Paint Division of the Emergency Unemployment Relief Committee, chairman, Horace Bowker, raised \$131,247.09 from chemical and paint industries, the chemical industry exceeding its quota, based upon 50% more than they subscribed last year, by several thousand dollars.

Mr. Bowker wishes to express his deep appreciation to the many firms and individuals of the industries who contributed through their subscriptions and personal efforts to the success of the campaign. Drug and Pharmaceutical Division, headed by E. W. Mann, Zonite president, with John M. Olwyler as vice-chairman, collected \$75,000. Success of this division was largely due, it was stated by Frank Kidde, vice-president, Monmouth Chemical, to the ability and energy of Mr. Mann, who undertook the work some weeks after the campaign had started.

Tax Returns

Secretary Mellon, minus the usual Santa Claus trappings and three days late, Dec. 28, managed, nevertheless, to bring considerable holiday spirit to large numbers with the publication of names entitled to tax refunds. Amount returned for the fiscal year 1931, showed sharp decline as compared with those of recent years and was the smallest since 1922.

Total as fixed by Secretary Mellon was \$69,476,930.26, which included \$17,311,567.99 in interest, as against \$126,836,333, including interest of \$37,971,711, in 1930. An estimate based on internal revenue figures, which included a few minor refunds not in the Secretary's recapitulation, gave the total as \$69,836,333. Refunds are actual cash repayments and do not include abatements and credits.

Chemical companies and those closely allied receiving refunds were:

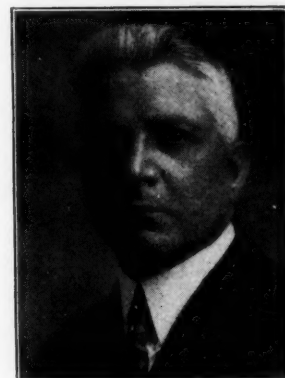
American Smelting & Refining.	\$20,355.28
Ault & Wiborg.	1,507.15
William S. Gray & Co.	55,601.91
Emile Pfizer.	3,887.30
Devoe & Reynolds.	6,213.86
Westvaco Chlorine.	6,286.60
General Carbonic.	8,092.11
Eastman Kodak.	1,350.00
National Gypsum.	3,508.21
Colgate & Co.	6,361.56
American Manganese Mfg. Co.	97,139.50
Columbian Carbon.	106,931.67
Du Pont.	65,606.26
Liquid Carbonic.	62,175.42
Sherwin & Williams.	35,016.52

20 Years Service

Charles H. Proctor, for twenty years R. & H. electroplating specialist, retired from active service Dec. 31, to devote his time to special work for the company, chiefly to assist in training R. & H. salesmen and also to act as a consultant on plating problems. His retirement from active duty comes after more than forty years of association with the electroplating industry, during which time he made many important contributions to the develop-

ment of the art both in this country and abroad.

In February, 1912, Mr. Proctor joined R. & H. and was instrumental in intro-



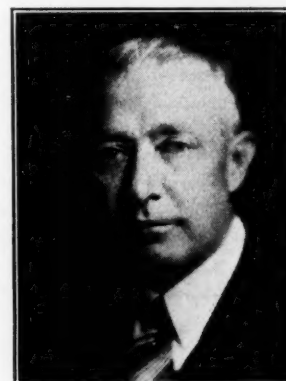
Charles H. Proctor
Plating industry dean

ducing Trisalyts (metallic triple salts, containing all the ingredients of the cyanide plating bath) to the plating industry. He also aided in developing metal cyanides for plating and did much to advance this modern type of plating salt. In 1922 Mr. Proctor helped organize the R. & H. Electroplating Laboratories, one of the first commercial plating laboratories to be operated by a chemical company for the purpose of helping platers to work out special problems and to furnish reliable information on plating processes.

In addition to his regular company activities, Mr. Proctor was also editor of the Chemical Electroplating-Finishing Department of "Metal Industry" for 22 years, relinquishing this position in 1929 because of the press of work.

Organized

Representatives of twelve manufacturers recently completed the final organization details of the Sulphonated Oil



Pres. C. P. Gulick
To bring order out of chaos

Manufacturers' Association, new trade body, national in scope, which is comprised of most of the leading manufacturers of sulfonated oils and their products. Officers elected for the first year: Charles

Chemical Business at a Glance

Shipments

Below November—lowest month for the year

Prices

Sharp advances in alcohol and ethyl acetate offset by losses in other commodities

Employment

Lower in December

Payrolls

December under November

Inventories

Lower in December

Stock Prices

Lower

Bond Prices

Lower

P. Gulick, National Oil Products, president; Chester M. Braham, The Arkansas Co. Inc., vice-president; H. B. Sweatt, secretary and treasurer. Offices located at 55 West 42nd St., N. Y. City.

Motives

Said Charles P. Gulick, president of the Association, in announcing its incorporation: "A prime factor in the organization of the manufacturers of sulfonated oils into a trade body is to improve marketing relationships between the producer and consumer. We plan as soon as possible to standardize analytical methods and have them accepted and recognized by the Bureau of Standards in Washington and the different consumer organizations. It is the hope of the organization that the badge of membership in the Sulphonated Oil Manufacturers' Association will guarantee a high order of business integrity and responsibility on the part of all sellers to all buyers."

Sulphonated Oil Manufacturers' Association is incorporated under the laws of New York State. Affiliated with the new organization as charter members are: Atlas Refinery; Arkansas Co.; John Campbell & Co.; Consolidated Color & Chemical; A. Klipstein; Martin Dennis Co.; National Oil Products; Onyx Oil & Chemical; Providence Drysalts; Royce Chemical; Salem Oil & Grease; and L. Sonneborn Sons.

Aid!

Have you a job to give out? Do you need a job? In either case communicate with the Bureau opened in Chemists' Club, 50 E. 41st st., by committee representing various local chemical societies. Registration and information service will be furnished without charge.

Committee on Unemployment and Relief for Chemists and Chemical Engineers, which has established the bureau, is sponsored by the following societies:—A. C. S. (N. Y. section), American Institute of Chemists, American Institute of Chemical Engineers, American Electrochemical Society, Association of Consulting Chemists and Chemical Engineers, Societe de Chimie Industrielle (American

COMING EVENTS

A. C. S., Rubber Division,
Detroit Feb. 25-16.

American Chemical Society
83d meeting, New Orleans, March 28-April 1.

American Drug Mfrs. Association, Greenbrier, White Sulphur Springs, Apr. 18-21.

American Institute of Chemical Engineers, spring meeting, Schenectady and Corning, N. Y., June.

American Scientific Congress, Mexico City, Feb. 5.

Electrochemical Society, Spring Meeting, Baltimore, Apr. 21-23.

International Congress of Pure and Applied Chemistry, Madrid, Spain, April 3-10.

Technical Association of the Pulp and Paper Industry, N. Y. City, third week of February.

section), Society of Chemical Industry (American section).

Members of the committee, all of whom will be active in an advisory capacity, are: Dr. Leo H. Baekeland, Horace Bowker, Francis P. Garvan, Dr. Charles H. Herty, Dr. D. D. Jackson, William J. Schieffelin, Dr. Maximilian Toch.

Won

Charles Weizman Patent, granted in September, 1929, for production of acetone and butyl alcohol by bacteriological processes is held valid in an opinion filed in Wilmington, Del., Dec. 29, by Judge John P. Nields in U. S. District Court in patent infringement suit of Guaranty Trust Co. of N. Y., the Butacet Corp. and Commercial Solvents against Union Solvents. Suit was one of the most important

patent infringement cases ever decided upon in the Wilmington district and has a very important bearing on the solvent market situation.

Court's opinion in addition to holding patent valid, holds that it has been infringed by Union Solvents and issued an injunction enjoining it from further infringement and directed it to file an accounting of profits derived from past infringement.

J. P. Carter, President, Union Solvents Corp. commented:

"An adverse decision has been rendered against us by the District Court of Delaware in favor of Commercial Solvents Corp. We will take an appeal promptly to the Court of Appeals and have every expectation of a final decision in our favor."

Washington

With a brand new speaker (Garner) wielding vigorously a brand new gavel the House settled down to the business of organizing for a session that will carry on until June. Controlled by the Democratic side, in power for the first time since the war period by a mere two vote margin, the House will quite likely find plenty to quarrel about with its neighbor in the opposite wing on Capitol Hill, still organized nominally by Republican votes.

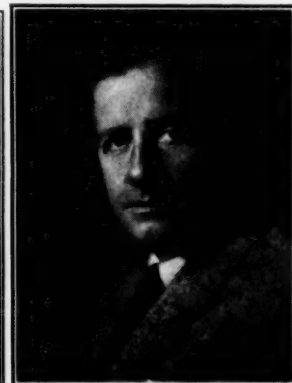
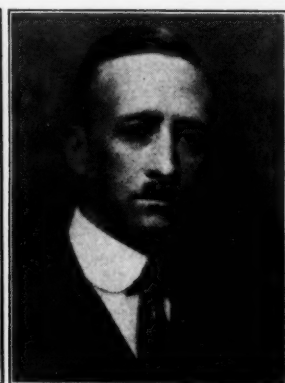
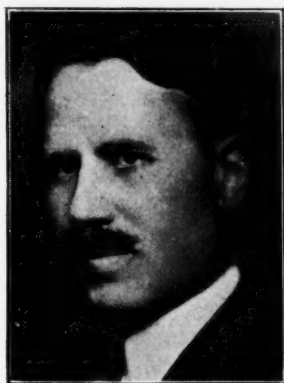
Although first 14 days were devoted principally to routine organization, several important measures were introduced which will later on prove very important to chemical industry.

President Hoover filled the two vacancies existing on the Tariff Commission. The new chairman, Robert L. O'Brien (Mass.) Republican leanings and I. M. Ornburn (Conn.) Democrat. Senate confirmation of the latter was still necessary as the Christmas recess was taken.

It is said that there are now four members who have high-tariff sympathies and two who incline toward lower rates. The latter two are Mr. Dixon and Mr. Page, while those said to have high-tariff views are the Chairman, Mr. Brossard; Mr. Coulter and Mr. Ornburn.

Muscle Shoals

President Hoover transmitted State-Federal Muscle Shoals Committee Report without comment; Two bills were introduced relating to the Shoals problem, H. R. 5622, by Representative Rich (Pennsylvania) and H. R. 6168, by Representative Lovette (Tenn.) the latter merely providing for building of Cove Creek. Senator Norris introduced S. J. Res. 15, and Representative James of Michigan (H. J. Res. 54) a bill which is practically a duplicate of the one vetoed by the President last year. Undoubtedly a bill will be introduced at a later date embodying the chief points contained in the Hobb's Report (State-Federal Muscle Shoals Committee).



Col. T. H. Murphy heads new unemployment committee for N. Y. area is assisted by Dr. C. R. Downs and Frank G. Breyer

Methanol Control

Methanol control was the object of two bills for Federal control, introduced, one by Senator Hiram Bingham (Conn.) and other by Senator Kenneth McKellar (Tenn.)

Bingham bill would place methanol under national prohibition law and prevent its use in food or drink, medicinal or toilet preparation, or radiator antifreeze compound, or its sale for any purpose, except under permit from Commissioner of Industrial Alcohol and except when bearing a poison label.

McKellar bill would require that interstate shipments of antifreeze containing more than 10 per cent of methanol be distinctively colored, contain an emetic, and in less than tankcar lots bear a poison label. In places under jurisdiction of the Federal government sales of "any antifreeze mixture or compound containing in excess of 10 per cent of methanol and/or ethyl alcohol" and would require sales of such mixtures to be recorded as poison sales. Measure would be administered by the Public Health Service.

N. Y. Section

Dr. Walter S. Landis, vice-president, Cyanamid, elected chairman N. Y. section, A. C. S., for 1932. He succeeds Prof. Arthur E. Hill, N. Y. U.



Dr. Walter S. Landis
To whom honor is due

Dr. Landis, vice-chairman of the section last year, was professor at Lehigh from 1907 until 1912, when he became chief technologist for Cyanamid. In 1924 he was named vice-president. He is a past president, American Institute of Mining and Metallurgical Engineers.

Professor V. K. La Mer, Columbia, chosen vice-chairman of the section, and Dr. David P. Morgan Jr., secretary-treasurer. Dr. J. G. Davidson, Carbide and Carbon, named to executive committee, other members of which are J. G. Detwiler, Prof. Arthur E. Hill and J. M. Weiss.

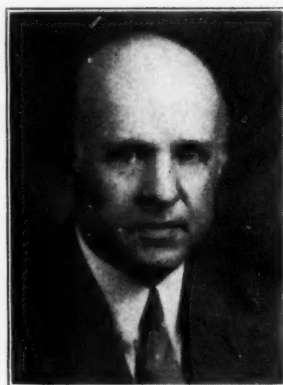
Councillors elected are Dr. Landis, Prof. La Mer, Dr. Morgan, Prof. Ross A. Baker, F. G. Breyer, Dr. B. T. Brooks,

Prof. H. T. Clarke, C. B. De Long, Prof. D. D. Jackson, Dr. J. V. N. Dorr, Prof. L. P. Hammett, M. H. Ittner, D. H. Killefer, H. B. Lowe, Leon V. Quigley, Prof. R. R. Renshaw, S. L. Tyler and L. W. Woodford.

Personnel

Warner D. Huntington, vice-president, Davison Chemical resigned Dec. 31 to assume position of director of fertilizer sales, for Cyanamid.

Mr. Huntington has been associated with fertilizer industry for many years. After serving in Spanish-American War,



Warner D. Huntington
Surprises the fertilizer world

he became sales manager, Jarecki Chemical. In 1903 he went to Buffalo to organize Buffalo Fertilizer Co., which later became a part of International Agricultural. Mr. Huntington remained in Buffalo for twelve years as sales manager and later manager. In 1915 he became vice-president, Davison Chemical. He has also been vice-president, Silica Gel since its organization.

Mr. Huntington has been active in the work of the N. F. A., and was chairman of its Soil Improvement Committee for fourteen years. He was vice-president of the Association during 1916 and 1917 and president in 1918 and 1919. In June 1931 he was elected chairman, Executive Committee, Manufacturing Chemists' Association.

Mr. Huntington is a member of the Baltimore Country Club, Engineers' Club, Chesapeake Club of Baltimore, and Chemists, New York.

Arthur Schroeder resigned from Fisher Scientific, and as secretary, Pittsburgh Section, A. C. S., and has moved to Chicago, becoming technical representative, Precision Scientific Co.

Max H. Zimmerman is now president, Eastern Chemical, Westbrook, Me., organized to do organic chemical research, manufacture special organic chemicals, and distribute chemicals.

Doremus Returns

T. E. Doremus, for the past two years acting as vice president in charge of miscellaneous dept., Grasselli, has completed his work with that organization and is now back with parent company. He will be associated with smokeless powder dept. as advisor in sales matters.

Harry J. Hosking resigned from research laboratory, R. & H., Niagara Falls, to take up similar work with Foster D. Snell, Inc., Brooklyn. W. C. Pinkerton is now industrial representative with Foster D. Snell. He was previously with International Exposition Co.

William L. Engresser joined sales staff, Alsop Engineering and will cover suburban New York and New England.

Sewell Avery, U. S. Gypsum head, elected chairman board of directors, Montgomery Ward.

T. R. Lawson, Rensselaer elected vice-president, A. S. T. M., to succeed S. T. Wagner, deceased.

H. E. Barnard appointed director, Corn Industries Research Foundation, new trade group of manufacturers of corn products.

Frederick W. Willard made executive vice-president, Nassau Smelting & Refining, a combination of Nassau Smelting & Refining Wks, Tottenville Copper, and Argus Smelting.

Carl J. Lamb, recently associated with Westinghouse joined Sharples Specialty, centrifugal engineers, Philadelphia.

C. A. Mackintosh, assistant to A. K. Hamilton, representing Penn. Sugar, in its sales and distribution of alcohol, resigned. He is succeeded by J. H. Dunphy

C. A. Dodge, formerly general manager, Feculose Company of America, joined staff of Doe & Ingalls, Boston, as manager, starch department.

Employment

Chemical employment continued to decrease during November. Payroll totals in this industrial group also decreased.

Employment			
	Nov. 1931	Oct. 1931	Nov. 1930
Chemicals.....	83.3	85.5	93.5
Fertilizers.....	46.8	49.0	73.6
Petroleum refining...	67.4	68.8	82.7

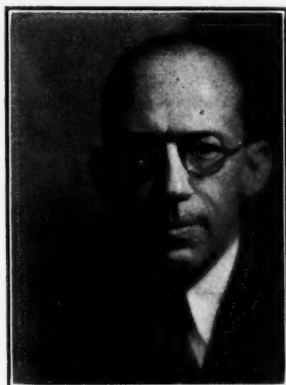
Payroll totals			
	Nov. 1931	Oct. 1931	Nov. 1930
Chemicals.....	76.8	82.2	91.0
Fertilizers.....	38.3	41.3	69.6
Petroleum refining...	64.2	66.6	85.1

Jan. '32: XXX, 1

Chemical Markets

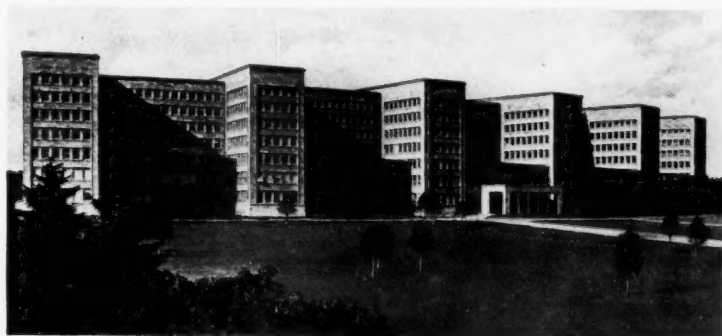
Dyes

Outstanding trends in the past few years in the international dye manufacturing picture, according to report made by Robert A. Lord and J. N. Taylor, Chemical Division, Commerce Department, are, the



J. N. Taylor
Summarizes recent dye trends

universal shift to more expensive fast dyes and colors of greater concentration and the decided concentration of the industry into the hands of fewer producers divided into national groups.



I. G.'s new central office at Frankfurt-on-Main completed in 1931.
All signs point to Great Britain joining international dye cartel at early date

Participating manufacturers claimed satisfactory operation of Franco-German-Swiss dye sales agreement during 1930 and 1931; but in this limited period and with present disturbed world conditions, it is difficult to gage accurately intensity of international competition.

German-Italian Combine

Outstanding events in German dye industry during 1931 have been the acquisition by I. G. of an interest in Italian dye industry and an improved condition in German foreign dye markets. Third quarterly I. G. report indicates that this favorable condition has been affected somewhat by currency depreciation in certain European countries but offset by seasonal increases in oversea trade. German Dye Trust has practically completed its 5-year program of rationalization and concentration and increasing efficiency through more extensive machine operation.

Important developments in British dyestuffs industry include continuance of the dyestuff import regulation act until

Dec. 31, 1932. The act in its present form, however, contains an important modification of its former effectiveness, in that applications for import licenses are being granted on basis of current world prices instead of previous basis of a multiple of prewar quotations, provided these are not "dumping" prices. I. C. I. has continued its policy of internal rationalization and consolidation, while general intensive dye research is reflected in the constant introduction of new colors.

Great Britain

Late reports indicate an appreciable improvement in the British dyestuffs trade. During the last few months decreased imports and an improved foreign demand are both attributed to depreciated value of sterling. It is reported that the I. C. I. is negotiating a general agreement with continental dye interests.

During the first 10 months of 1931 conditions in Swiss dye industry showed slight improvement. Franco-German-Swiss dye sales agreement and Basel I. G. are reported to have been important factors in keeping sales at present levels. Recent Ciba statutory changes have enhanced possibility of strengthening Basel I. G.

Produits Chimiques de Saint Denis, with whom Kuhlmann interests have a trade agreement, provides approximately 24%.

The principal recent development in Italy has been reorganization of the Aziende Chimiche Nazionali Associate (A. C. N. A.) of the former Italgas group under the name "Aziendi Colori Nazionali Affini." A. C. N. A. is capitalized at 60,000,000 lire, held jointly by the German I. G. and Italian Montecatini, in the proportion of 29,000,000 and 31,000,000 lire, respectively, and will continue to operate the dye plants of the former A. C. N. A.

Exports

U. S. chemical exports gained in 1930 at the expense of other countries. Chemical exports of France, Germany, Great Britain, and the United States aggregated \$719,421,000 in 1930, compared with \$844,702,000 in 1929. The export trade of the several countries, in the order of their 1930 shares, compared for the two years as follows:

	1930	1929
Germany.....	\$296,892,000	\$346,617,000
United States.....	172,248,000	211,524,000
France.....	126,176,000	137,494,000
Great Britain.....	124,105,000	149,067,000

Mellon Fellowship

Director Weidlein, Mellon Institute, announced that Macbeth-Evans Glass has established a Fellowship in illuminating glassware. Scientific investigations that will be conducted along original lines and entirely independent of the technologic research that is carried on in the Macbeth laboratories. Dr. Rob Roy McGregor, specialist in physical chemistry, was appointed to the Fellowship.

Du Pont Economist

Edmond E. Lincoln joined du Pont staff as economist, a new position created to centralize and develop work along this line for parent company and its subsidiaries, in cooperation with the Executive Committee, Finance Committee and department heads. During the past four or five years Mr. Lincoln was associated with International Telephone and Telegraph as economist and on special staff duties for the president. Before that he was for five years chief statistician and economist of Western Electric.

Production of coal-tar dyes, by leading countries

Country	1928 Thousand pounds	1929 Thousand pounds	1930 Thousand pounds	Decline, 1930 Per cent
Germany ¹	165,000	165,300	154,300	6.6
United States.....	96,625	111,422	96,480	22
Great Britain.....	50,907	55,785	42,590	24
France.....	34,398	36,224	35,164	2.6
Russia ²	24,251	27,873	35,078	(*)
Switzerland ³	23,857	24,347	20,039	18
Japan.....	18,457	17,188	17,153	0.04
Italy.....	15,211	16,314	(*)	.....

¹Estimates.

²Reported in Die Chemische Industrie, Sept. 19, 1931, for fiscal year ending in September.

³Increase of 25.8.

⁴Not available.

Canadian Fertilizer recently opened new warehouse at Wallaceburg, Kent County, Ontario.

U. S. Potash, formerly at 598 Madison Ave., now located at 342 Madison, N. Y. City.

Rubber Regenerating Co., for years rubber reclaiming subsidiary of U. S. Rubber, absorbed by Naugatuck Chemical, also a U. S. subsidiary.

Phelps Dodge informed domestic and foreign copper producers that it was ready and willing to put into effect the proposed curtailment agreement.

Nopco Laboratories, division of National Oil Products, developed new moel-lon for tanning industry. Product, to be known as "Tanoyl 1621," is said to possess unusual fat-liquoring qualities and freedom from separation on storage.

Proposal to change name of Grasser Monsanto Chemical Works, Ltd., to Monsanto Chemical Works, Ltd., approved by directors. Change effective Jan. 1.

Pure Carbon, Wellsville, N. Y., merged with Stackpole Carbon, St. Mary's, Pa. Plant will be dismantled and equipment moved to Stackpole plant.

Contract for 150,000 lbs. of dynamite for Panama Canal Zone awarded Burton Explosives, New Castle, Pa.

Commercial Solvents Peoria plant is operating at capacity in preparation for spring demand for solvents.

Tungsten Producers, Fruitland, Wash., installed new machines and is now ready to handle large supply of ore.

Chas. Pfizer December price list showed 13 declines and no advances.

M. H. Haselden and John E. Gibbs appointed temporary receivers Merchants Fertilizer and Phosphate, Charleston, South Carolina.

Pyrometer Division, Wilson-Maeulen Co., merged with Foxboro. Entire personnel will be merged with that of Foxboro.

Answer denying allegations of fraudulent use of secret chemical processes and breach of contract contained in injunction suit brought by Monsanto and Rubber Service, filed Dec. 1, in federal court by defendants, C. Olin North, Winfield Scott and Kavalco Products.

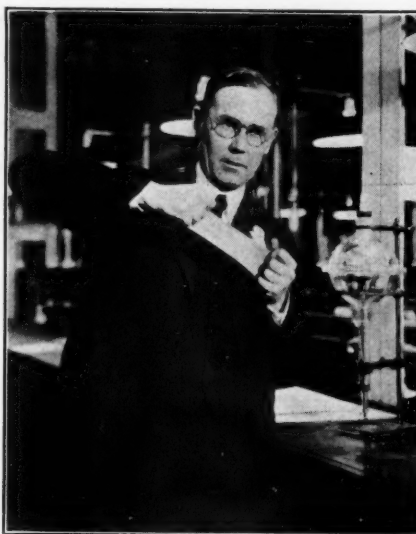
Answer denies defendants ever used or disclosed to others trade secrets of plaintiffs or have violated any obligation. Processes of manufacturing phenolph-thalein, triphenyl phosphate and tricresyl

Company News

phosphate were developed by individual research by defendants since leaving employ of Rubber Service at cost of \$70,500, answer states. Answer alleges, products made by defendants are manufactured by different processes.

Silica Products bentonite plant, near Newcastle, Wyo., destroyed by fire, causing loss estimated at \$50,000.

\$500,000 worth of equipment went under the hammer for \$3,450. Entire plant of Waterloo Distilling, Waterloo, N. Y., sold at federal marshal's auction. The plant, formerly one of the country's largest producers of industrial alcohol, was at one time worth more than \$500,000. It is now in the hands of salvage firm.



Dr. W. H. Carothers, duPont Proves synthetic rubber is elastic

New phenol plant of the Dominion Tar & Chemical of Toronto started operations. The plant is an important addition to the Canadian chemical industry.

Naval stores' technical division of the Hercules Powder announced discovery of an improved method for liming rosin which by the new method results in the production of limed rosin of great clarity and hardness and in greatly improved gloss oils. The method was devised at the Hercules Experiment Station. It is stated by Hercules technicians that the procedure is very simple and may be used by any varnish maker or by almost anyone using rosin hardened with lime.

The naval stores department of the Hercules Powder, offers to furnish any interested person information on the improved method.

Standard of Indiana is reported to be negotiating for interest in the Nitag (Naphtha Industrie und Tankanlagen

A. G., Berlin). It is proposed that the Nitag shall increase its capital from Rm.2,550,000 to Rm.5,600,000, the new shares to be taken up by the American oil concern.

Dr. Edwin Fitch Northup, Princeton, vice-president and technical advisor, The Ajax Electrothermic Corp. using furnace of the Ajax-Northrup inductor type established a heating method with an achieved limit at the present time of 3,600 degrees centigrade, but unlimited in size and control.

Representing a distinct gain in high temperature technique, method not only shows it to be commercially practicable to maintain controlled temperature of 3,000 degrees centigrade for a long period, a result not obtainable in furnaces of usual design, but in accomplishing the task the limits of controlled volumes of heat were pushed up nearly 1,000 degrees centigrade.

The furnace comprised an Acheson graphite energy-absorbing crucible packed in a refractory insulation of lampblack known as thermatomic carbon, which has the property of giving off very little or no gas at the highest temperature.

Cyanamid reduced salaries 10% effective Jan. 1.

General Dyestuff is offering Chromoxane Pure Blue B A, which is principally recommended as a chrome-topped color, but may also be used according to the chromate or chrome mordant method.

Pfaunder Co. organized the Pfaunder Company of Canada, Ltd. Headquarters of new subsidiary are in the Dominion Square building, Montreal. E. C. Longmore is managing director.

The Glyco Products Co., Inc., Brooklyn, is manufacturing a new product called Glycesterin which is suitable for use in creams, ointments and polishes to replace beeswax and effect considerable economies in costs. It is said to be a pure white wax somewhat harder than beeswax but having a lower melting point. It is edible and noncorrosive.

Statute of limitations was properly applied to prevent Nitro Chemical from entering suit in Court of Claims for payment on a wartime contract, the Supreme Court of the United States decided.

Hypochlorite Products Corp. chartered to manufacture solution for use as deodorant, antiseptic and germicide. Plant at Tonawanda, N. Y., is being equipped with latest machinery.

Supreme Court denied U. S. Gypsum Co. a review of lower court decision in company's dispute with Plastoid Products, Inc., over trade-mark "rocklath."

Personal

Dr. John Emery Bucher, New York consulting chemist, elected member of staff of Antioch College Research Institute. Dr. Bucher, inventor of process for nitrogen fixation, formerly was head of chemistry department, Brown University and during the World War was a member of naval consulting board.

Dr. Anton Hogstad, Jr., assistant to president of Merck & Co., appointed chairman, committee on Pharmacy Week of the American Pharmaceutical Association.

Died. William S. Lyon, 88, for 70 years connected with Church & Dwight. Mr. Lyon entered the employ of John Dwight & Co. on Feb. 2, 1862 and although the past few years were spent in comparative retirement he never entirely severed his connection with the successor company, Church & Dwight.

Died. Stephen John Popoff, 46, associate professor, chemistry and head of division of analytical chemistry, State University of Iowa, Oct. 29. He suffered mental breakdown last year, and was given leave of absence, spending remainder of year in a sanitarium in Minnesota. Resumed work in September, but was unable to continue.

Died. Hervey C. Morris, service expert naval stores dept., Hercules Powder, connected with company for past eight years.

Died. Gustav von den Steinen, 61, president Glascote, Cleveland, Dec. 5.

Died. David B. Opie, 83, who had been in the employ of Bowker Chemical at Cartaret, N. J., for 49 years, Dec. 7. He was a veteran of the Civil War. Four daughters and eight grandchildren survive.

Died. John W. Robinson, president Logan-Robinson Fertilizer, Charleston, Dec. 3rd.

Died. William C. Warner, 61, vice-president, Maltbie Chemical, Newark, N. J. Employed first as chemist in 1893 he succeeded to his last position several years ago.

Married. Thomas B. Chadwick, Southern representative, Charles Pfizer, Dec. 17.

Married. Eugene R. Grasselli, Jr., and a Mrs. Louise Hammond Blatt of Joliet, Ill.; in Manhattan.

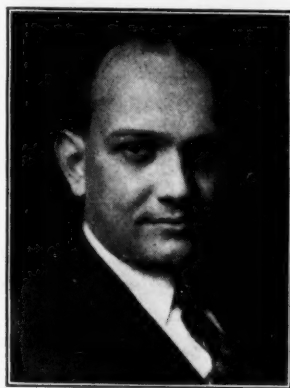
Born. A daughter, Anne McNulty, Dec. 19 to Mr. and Mrs. Frank B. McNulty. Mr. McNulty is associated

with his brother Joseph A. McNulty, red oxide and earth pigment importer.

Honored. Edward Zink, Executive Committee Drug, Chemical & Allied Trades Section, N. Y. Board of Trade a farewell dinner for Edward Zink, formerly eastern sales manager, Eli Lilly & Co., Tuesday, Dec. 8, at Waldorf-Astoria. Mr. Zink, became January 1st, sales manager, Eli Lilly.

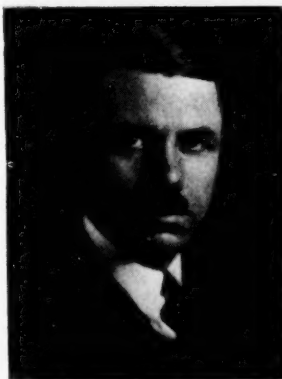
Reports

Committee on Chemicals, Drug, Chemical and Allied Trades Section, N. Y. Board of Trade completed its annual report which is to be presented for the



Percy Magnus
Completes years service as Chemical Section Head

approval of the members at annual meeting in January. Committee chairman, C. Leith Speiden, Innis, Speiden & Co., was assisted by George Felder, Malinekrodt, A. H. Rowe, Heyden, and J. Arthur Winter, Franco-American Chemical.



Chairman C. Leith Speiden
Reports chemical industry suffers less

Committee on Chemicals reports that during the past twelve months demand in most cases did not reach low levels reported in other industries. Business for the first half of the year was more satisfactory than the last, from which it might be inferred that the dropping sales volume curve followed at a much later date those evidenced in other lines. Unseasonable

weather has affected the lighter chemicals while heavy chemicals are quoted at low prices, which would be expected from the decreased demands in automobile and textile industries. Earnings reported by leading companies in first nine months are much more favorable than decline in the general industrial average.

Tariff

Maintenance through many years of a consistent tariff policy has protected industry, and discussion will tend to aggravate present unsettled business condition. The national policy in preventing dumping of low wage, and low price, products should not be seriously disturbed at this time. Tariff Commission, through its modification of present rates, corrects any differences which may exist between the cost of production here and abroad, and acts as an important factor for stability.

Foreign exchange has affected the chemical industry somewhat adversely, and competition is particularly keen with those countries having depleted currencies, and who have abandoned the gold standard. Trade with some of our good customers has shown a marked decline, but, on the other hand, trade with the Orient, particularly China, has increased materially, due to the boycott on Japanese products. Governmental agencies should do everything in their power to increase foreign trade.

Research

Chemists have continued in their efforts to produce new products and improve, and lower, the cost of existing ones. Scientific research, and this is particularly true in the chemical industry, has further aided in erasing the monopolies placed on many well-known raw materials by their geographical location.

Inventories

Present low inventories and resulting hand-to-mouth buying has brought about a condition where a small increase in demand will lead to distinct improvement. Selling of small quantities, in this respect, adds appreciably to cost of distribution, while fluctuation in price, due to nervousness on part of producers, is noted. Delayed fall season will make more evident the rise expected in the next few months.

There are some temptingly low values existing, and volume and profits, as to be expected, are below 1929. However, tonnage is keeping at high levels even if decreases are apparent in the dollars and cents values. Chemicals, like other commodities, have declined in price, but this is to be expected as the dollar takes on new value and significance.

Godfrey S. Rockefeller and Chauncey D. Stillman, elected directors, Freeport Texas.

Freight Rates

Inter-State Commerce Commission, Dec. 7, permitted railroads to put into effect plan to provide for needs of financially depressed railroads through medium of loans administered by credit corporation from moneys realized from certain freight rate increases authorized by the Commission.

Commission further modified original report so as to provide a cents-per-ton basis instead of a dollars-per-car basis on certain commodities slated for increases. Lighterage charges are included with switching charges in a proposed increase of 10%, while less-than-carload rates are given an advance of 2 cents per 100 pounds.

Six Cents

On following commodities, in carloads, there may be an increase of six cents per ton of 2,000 pounds: Anthracite coal, bituminous coal, coke, iron ore, copper ore and concentrates, lead ore and concentrates, zinc ore and concentrates, ores and concentrates, n.o.s., gravel and sand (other than glass or molding). (1) Products of mines, n.o.s., as follows: Borate rock, bituminous rock, bituminous asphalt rock, iron pyrites, limestone (crushed-ground), dolomite, earth or soil (No. 1 B. N.) feldspar, flourspar, fluxing stone, ganister rock, glass sand, crude gypsum, loam, molding sand, nickel matte, ore residue, slate (crushed, ground or scrap). Pulpwood. (1) Pyrites cinders, refuse or dross.

Phosphate and Sulfur

On following commodities, in carloads, there may be an increase of 12 cents per ton of 2,000 pounds: Phosphate rock, crude (ground or not ground). Sulfur (brimstone). (1) Products of mines, n.o.s., as follows: Bentonite, china clay, ground flint, fire clay, gilsonite, ground gypsum, not calcined; kaolin, barium sulfate, ground (barytes), not precipitated; barium sulfate, ground (barytes), precipi-

tated (blanc fixe); magnesium sulfate, crude, or kieserite; micascrap or screenings, pipe clay, shale, slate not crushed, ground or scrap; soap stone (talc), ground, dust, lump or rough slabs; chalk, crude clay, No. 1, b. n.

On commodities, in carloads, except as otherwise noted, there may be an increase of one cent per 100 pounds: Cottonseed meal and cake. Vegetables, oil cake and meal, except cottonseed. Petroleum, crude. Asphalt (natural, by-product or petroleum). Rosin. Turpentine. (1) Pine tar. Petroleum, oil refined, and all other gasolines. Fuel, road and petroleum residual oils, n.o.s. Lubricating oils and greases. Petroleum products, n. o. s. Lime, common (quick or slaked). Fertilizers, n.o.s. (1) Tar and pitch, except brewers and montan.

Baltimore, home of the world's largest copper refinery, will be the meeting place for the spring convention of the Electrochemical Society, to be held April 21, 22 and 23, 1932. Baltimore is among the leading manufacturers of sulfuric and has the world's largest phosphate plant. Chemicals and chemical products loom large in the city's industries. Baltimore is the largest fertilizer producing center in the country and operates the largest alcohol manufacturing plant in the world.

Dr. J. T. MacKenzie, Birmingham, Ala., will be in charge of symposium on "The Electric Furnace and Its Products." Another Scientific-technical session will be on "Electrolytic Copper and Its By-Products." F. A. Lidbury, Niagara Falls will preside at the Round Table Discussion on "Electrochemistry and the Fertilizer Industry."

Aided

Medley G. B. Whelpley, member, Guggenheim Bros., announced Dec. 13 that arrangements had been made to provide for current financial requirements of Com-

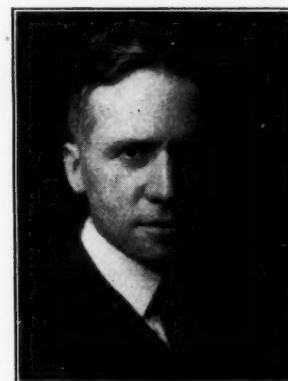
pania de Salitre de Chile (Cosach) during remainder of present nitrate year, ending on June 30, 1932. Arrangements resulted from agreements concluded with Chilean Government and, by the assistance of Guggenheim Brothers with company's English and United States bankers.

Chilean Government has extended an invitation, which has been accepted by the company, to hold further conferences in Chile with the Government and with the holders of the company's obligations and others interested in the company. It is hoped that a permanent practicable accord may be reached, Mr. Whelpley said.

"New financial arrangements for the company," commented Mr. Whelpley, "are predicated on the Government's re-affirmation of the historic Chilean policy that financial obligations contracted will be respected by the Government, thus evidencing again the confidence in which the undertakings of the Chilean Government are held in the financial markets of the world."

Adopted

Insecticide and disinfectant industry, which held a trade practice conference in Indianapolis, in November 1926, accepted, Dec. 11, rules of that conference following a number of changes suggested by Federal Trade Commission.



Pres. Evans E. A. Stone
Now guides insecticide group

Commission divided a former resolution concerning an existing business practice into two parts. Commission approved rule in one part and accepted as an expression of the trade the rule in the other part.

The Group I rule refers to giving money or anything of value to agents of customers or of competitors' customers without the knowledge of their employers, as an inducement to influence their employers to purchase products from the maker of such gifts, or to influence such employers to refrain from dealing with competitors. Group II rule refers to matter of observance by the industry of the Group I rule.



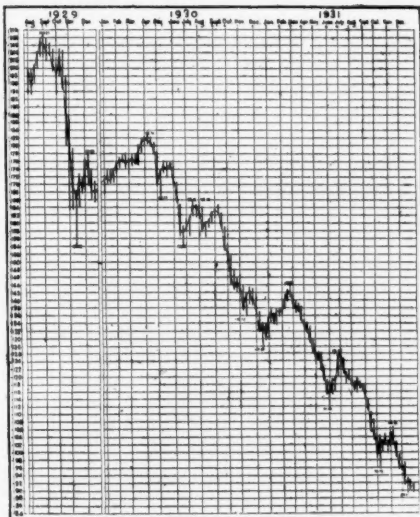
Standard's Bayway oil hydrogenation plant completes eight months of continuous operation. Engineers in charge are justifiably proud of this record made in America's first large-scale hydrogenation plant

The Financial Markets

Stock Market Declines Violently as Year Closes—Du Pont and Standard of N. J. Announce Employee Stock Plans—Whitney Discloses Short Interest in Chemical Stocks—United Chemicals Announces Stock Exchange Terms.

December proved no exception in the almost continuous downward flight in stock market values. On Dec. 17, the bear-market-low for the current business recession occurred, and although the three succeeding days witnessed feeble rallies, prices as the month and year ended again reacted violently to adverse news. The proverbial last week rally failed to

Three Year Stock Market Trend



—N. Y. Herald-Tribune

materialize. Values of 240 stocks listed on the N. Y. Stock Exchange, composing twenty of the most important groups, depreciated \$2,447,200,209, or 18%, in December, compared with a loss of \$1,784,140,068, or 15%, in November, according to a compilation of "The New York Times." In December, 1930, there was a depreciation of \$2,322,152,795, equal to

10%. Prices on the average are now at the lowest level since 1922, according to most of the accepted market indices.

Values

Values of 240 issues on the Exchange were \$13,531,625,106 less at the end of 1931 than at the end of 1930, or 55%. They had shrunk \$40,381,580,576, or 78% since the end of September, 1929, the last full month of rising prices.

Group Changes

Group changes in values for December, compared with a year ago, follow:

	1931	1930
Amusements.....	—\$37,807,406	—\$71,433,482
Building.....	—38,877,363	—61,937,689
Business equip.....	—20,419,972	—8,034,405
Chain stores.....	—112,819,623	—103,473,479
Chemicals.....	—85,986,226	—131,605,516
Coppers.....	—99,352,435	—173,615,899
Dept. stores.....	—22,786,970	—44,315,158
Foods.....	—154,033,263	—96,334,201
Leathers.....	—564,652	—1,360,951
Mail order.....	—40,352,282	—82,089,773
Motors.....	—115,173,754	—19,065,888
Motor equip.....	—8,683,973	—6,048,264
Oils.....	—439,924,830	—442,639,798
Public utilities.....	—643,693,901	—428,336,739
Railroads.....	—336,440,043	—400,170,753
Railroad equip.....	—29,053,810	—61,633,464
Rubber.....	—7,824,989	—19,126,661
Steels.....	—203,713,237	—106,750,706
Sugars.....	—9,034,917	—18,050,311
Tobaccos.....	—40,656,563	—46,129,658

Chemicals

The chemical group followed quite closely the general trend of the market. The first week of the month was one of slight appreciation in values and was followed by a sharp decline that brought most market leaders down to new low figures. Three days of higher values were followed by further losses continuing daily up to the last day when some slight improvement appeared. The dollar depreciation of the nine issues comprising the chemical group of the New York

Times amounted to \$85,986,226 made up as follows:

Allied Chemical & Dye.....	\$21,311,431
Commercial Solvents Corp.....	3,479,008
Davison Chemical Co.....	630,084
Du Pont de Nemours & Co.....	19,364,919
Mathieson Alkali Works.....	1,300,798
Texas Gulf Sulphur.....	11,114,250
Union Carbide & Carbon.....	27,664,206
U. S. Industrial Alcohol.....	1,121,532
Virginia-Carolina Chemical.....	.....
Total.....	\$85,986,226

Average Price

CHEMICAL MARKETS Average Price for 15 representative common industrial stocks reached a new low figure in December. The Price for the five Fridays in the month stood as follows: Dec. 4, \$29.40; Dec. 11, \$27.17; Dec. 18, \$27.47; Dec. 24, \$26.56; Dec. 31, \$26.95. The previous low figure was reached in the week ending Oct. 2 when the price reached \$29.79. Stocks included in the price are Air Reduction, Allied, Davidson Chemical, Anaconda, Columbian Carbon, Commercial Solvents, Corn Products, Devoe & Reynolds, du Pont, Liquid Carbonic, Standard of N. J., U. S. I., Texas Gulf Sulphur, Union Carbide, and Cyanamid.

Some idea of the severity of the decline in chemical stock values in the past six months may be had from a glance at the following figures showing the increase or decrease registered by the nine stocks comprising the Times chemical group.

	Decrease	Increase
July.....	\$138,230,060	.....
August.....	16,718,654	\$37,924,665
September.....	583,723,875	.....
October.....	4,149,625	62,991,222
November.....	67,665,473	.....
December.....	.....	.....

Deflation

It is difficult to believe that the process of deflation did not reach the last stages in December when comparison of prices prevailing on Jan. 3, 1931 is made with those existing as the year closed.

Name	Jan. 3, 1931	Dec. 31, 1931	Net Loss
Allied.....	176½	68½	—107½
Air Reduction.....	101½	49½	—51½
Anaconda.....	32	9½	—22½
Col. Carbon.....	79	34	—45
Comm. Solvents.....	16½	8½	—7½
Du Pont.....	89½	55½	—34½
Stand., N. J.....	48½	27½	—21
Texas Gulf.....	47½	22½	—24½
U. S. I.....	65½	26½	—39½

Du Pont employees may subscribe to 6 per cent cumulative non-voting stock of the company in 1932 under the employees stock investment plan at \$104 a share, it is stated. Price for 1931 was \$117 a share. Stock will pay \$3 a share in regular dividends, in addition to which under certain conditions extra payments are made.

Price Trend of Chemical Company Stocks

Name	Dec. 4	Dec. 11	Dec. 18	Dec. 26	Dec. 31	Net change
Allied Chem.....	73½	68½	71	66½	68½	—4½
Air Reduction.....	54½	49½	49½	50½	49½*	—4½
Anaconda.....	12	10½	11½	10½	9½	—2½
Columbian Carbon.....	36½	34½	36½	33½	34	—2½
Comm. Solvents.....	9½	8½	8½	7½	8½	—½
Du Pont.....	54½	51½	55½	54	55½	+1½
Mathieson.....	16	14½*	12	14½	14½	—1½
Monsanto.....	22½	19½	19½	20½	21½	—½
Standard of N. J.....	31½	29½	29½	26½	27½	—3½
Texas Gulf.....	25½	22½	22½	22½	22½	—2½
U. S. I.....	28½	27½	27½	26	26½	—2½

*ex-dividend.

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Company

Shorts

Summoned to Washington to lay bare the naked truth about bears and the short interest, Richard Whitney, president, N. Y. Stock Exchange, surprised even the most rabid anti-Wall Street antagonists. Reaching down into his voluminous mysterious



Richard Whitney
Confounds his critics

black bag he managed to refute and confound with statistics critics of the Exchange policy of permitting short selling.

Mr. Whitney, still a disciple of the venerable law of supply and demand (Chemical Markets, Oct. p. 359, "What Price Recovery, A Defense of the Law of Supply and Demand") told Washington inquisitors that short selling was not only legitimate, but at times, highly necessary, cushioning the market in times of great stress.

Comparison of total shares short with total shares outstanding indicates quite clearly that short selling has played a very minor role in the long continued decline in security prices. Forty-eight hours later, reaching down still further into his "kit", President Whitney produced a complete list of stocks together with short position on five different dates, overwhelming proof that bears were but a small factor. Consensus of opinion is that Mr. Whitney

pulled a rabbit out of the hat at the psychological moment and has perhaps frightened prying senators and congressmen away from a congressional investigation.

Statistics

Following table shows chemical and allied industry stocks having short interest of 500 shares or more on any one of the six dates. The first date, May 25, marked the beginning of the Exchange's inquiry into short selling. The second date, June 26, was selected because it showed short position at approximately the peak of the June advance. Sept. 11 was the halfway mark between market's high level of June and its high point of November. Oct. 5 was the date on which the market broke through June lows. Nov. 9 saw climax of the Autumn rally. Nov. 30 is the last date embraced in the Exchange's report.

Aluminum Ltd. made following announcement of postponement of dates of exercising its outstanding cum. share subscription warrants:

"It has been decided that the time for exercising the 'B', 'C' and 'D' warrants will be further extended in each case approximately six months.

"The final date on which 'B' warrants may be exercised will be July 2, 1932. The final date on which 'C' warrants may be exercised will be Oct. 1, 1932. The final date on which 'D' warrants may be exercised will be Jan. 3, 1933."

Standard Oil (N. J.) directors decided to put into operation fourth stock acquisition plan for employees as authorized by stockholders. Questionnaire sent out to over 19,000 participants in third plan has received a favorable response, 88% of the 15,000 replies received up to Nov. 10 being in favor of starting the new plan Jan. 1. Fourth plan will follow substantially along lines of one now approaching conclusion.

One-third for One

United Chemicals deposited with Guaranty Trust, 11,568 shares of 7% pref. stock of Westvaco which was made available for exchange for \$3 pref. stock of United Chemicals, Inc., in the ratio of one-third of a share of Westvaco



Pres. W. B. Thom
Stock plan is disputed

preferred for each share of United Chemicals pref. stock.

President Thom stated that holding of Westvaco preferred is no longer essential to the company. As of Sept. 26, 1931 net assets of United Chemicals at cost were equivalent to \$65.65 a share on preferred. Dividend was reduced to \$2 annual rate as of Dec. 1, 1931, due to decline in earnings. Westvaco, on the other hand, earned dividend requirements on preferred 4.4 times in the first nine months of 1931. Assets at cost were equal to \$291.79 a share for its preferred. Furthermore, by making this exchange stockholders will receive \$2.33½ in dividends against a rate of \$2 on United pref. stock for each share not exchanged.

Listing

After this exchange it is anticipated that the distribution of Westvaco preferred will be sufficient to warrant application for its listing and this application probably will be made. The time for exchange was fixed at 12 noon Dec. 31, 1931, and certificates of deposit will be issued not later than Jan. 15, 1932.

Sues

Laurence A. Slaughter, a United Chemicals' preferred stockholder, filed suit in Chancery Court, Wilmington at the end of the month to enjoin United Chemicals, from carrying out exchange of preferred stock.

Slaughter alleges plan of exchange is illegal, not authorized by Delaware corporation law, and grossly unfair and inequitable to him as a preferred stockholder, and that plan is merely a proposal by defendant company to purchase its own preferred stock by paying a consideration, not in cash but wholly in assets now held and in the form of shares of another corporation.

Total Shs. Listed as of Nov. 30 '31	Name of Company	May 25	June 26	Sept. 11	Oct. 5	Nov. 9	Nov. 30
841,289	Air Reduction Co. Inc.	35,700	20,921	19,900	13,200	9,975	12,378
384,189	Am. Com'l Alc. Corp. v t e.	2,300	.....	700	.....	700	150
503,282	Amer. Solv. & Chem. Corp.	1,300	.....	900	100	125	100
538,420	Columbia Carbon v t e.	5,800	2,610	10,900	1,800	4,545	5,544
2,530,103	Commercial Solvents	10,500	10,396	16,200	5,800	5,923	4,855
2,253,000	Corn Products Refining	21,800	14,910	19,000	6,100	3,895	14,238
504,067	Davison Chemical	.....	1,670	1,200	400	370	.....
11,065,668	Du Pont de Nemours	116,600	76,210	98,200	76,800	70,001	108,271
729,783	Freeport-Texas	3,100	2,260	1,900	700	6,147	1,915
413,333	General Asphalt	600	505	.....	200	1,108	2,327
670,775	Glidden Co.	300	700	.....	500	105	.....
750,000	Johns-Manville	44,900	45,846	30,700	11,300	17,110	22,350
342,406	Liquid Carbonic	2,300	2,710	1,800	1,000	335	290
1,082,555	McKesson & Robbins	100	1,525	5,700	200	100	1,190
309,831	National Lead	4,600	4,480	2,100	1,900	1,520	1,420
433,773	Penick & Ford	4,200	370	2,200	500	285	285
6,410,000	Procter & Gamble	6,500	3,835	6,600	14,100	5,952	7,955
3,038,370	Pure Oil	1,800	1,806	600	900	655	246
13,070,625	Shell Union Oil	4,900	3,929	6,600	300	2,130	585
31,677,768	Socony-Vacuum	.....	.....	10,700	3,700	3,025	3,272
25,677,466	Standard Oil Co. (N. J.)	37,600	27,677	20,200	26,600	31,442	24,322
857,869	Tennessee Corp.	600	200	600	400	250	450
9,851,211	Texas Corp.	49,300	28,307	15,800	6,200	8,071	7,428
2,540,000	Texas Gulf Sulphur	37,500	10,761	6,400	4,100	4,206	5,491
9,221,402	Union Carbide & Carbon	125,700	82,138	92,100	24,300	21,053	36,630
397,885	United Carbon	400	.....	100	800	1,190	830
1,251,821	U. S. Gypsum	1,900	500	.....	700	520	720
373,844	U. S. Industrial Alcohol	8,100	4,970	4,400	800	6,218	10,768
378,368	Vanadium Corp.	31,900	40,641	42,400	9,300	13,931	9,550

United Chemicals, Inc., was formed in 1929 as a holding company to take over 51% of the preferred and 51% of the common stock of Westvaco Chlorine Products Corp.

Magadi Suspends

Magadi Soda Co., Ltd., holders of the £425,700 six per cent debentures received offer of compromise of their rights involving surrender of their debentures in exchange for 7 per cent pref. shares of £1 each of Imperial Chemical Industries, Ltd., at the rate of 40 shares for £100 nominal debentures. The offer also involves the issue by Magadi Soda, to I. C. I., of a fresh series of 6 per cent debentures nominal value of £250,000 in exchange for existing debentures, which are to be cancelled.

Soda company's sole business is exploitation of natural soda lake in Kenya Colony, and I. C. I. is at present managers of the company, Sir Harry McGowan being chairman. In connection with these proposals, I. C. I. and Magadi Soda, have made tentative arrangement with Kenya Government for moratorium of the Magadi company's obligations under its leases, which call for minimum output of 100,000 tons of soda annually. During period of moratorium I. C. I. will make the Kenya Government annual payment of £10,000.

Profits of Magadi Soda, have shown heavy decline since 1928, and are no longer sufficient to cover debenture interest and redemption.

No Compromise

Magadi Soda on Dec. 15 rejected offer of Imperial Chemical Industries, to holders of Magadi debentures to exchange their holdings for Imperial Chemical preference shares. Directors of Magadi Soda now announce that they intend to continue business and call up capital immediately to meet the company's requirements, including debenture interest. Debenture holders will receive half year's interest on due date.

Now One

Clorox Chemical cancelled all distinction between class A preferential and class B common shares. Upon completion of details, company will have only one class of capital stock, aggregating 118,156 shares with an annual dividend rate of \$2 a share.

Dividend Action

National Gypsum directors declared dividend \$1.75 a share on \$7 cum. pref. stock, payable Jan. 2 to holders of record Dec. 15, and covering quarter from Oct. 1 to Dec. 31, 1931. Dividends in arrears, after this payment, amount to \$21.50 a share on stock. A similar distribution was made on Oct. 1 last. Dividends of \$1 a share were paid Jan. 2, April 1 and July 1, 1931.

Dividends and Dates

Name	Div.	When Payable	Books Close
Abbott Labs.	\$0.62½	Jan. 2	Dec. 16
Air Reduction	.75	Jan. 15	Dec. 31a
Allied C & D.	1½%	Jan. 2	Dec. 11a
Allied C & D.	\$1.50	Feb. 1	Jan. 11
Cabot	\$15.00	Jan. 30	Jan. 15
Carman	\$0.50	Mar. 1	Feb. 15
Colgate	1½%	Jan. 1	Dec. 10a
Du Pont	1½%	Jan. 25	Jan. 9a
Eastman	\$1.25	Jan. 2	Dec. 5a
com.	\$0.75	Jan. 2	Dec. 5a
pref.	1½%	Jan. 2	Dec. 5a
Hereules	1½%	Feb. 15	Feb. 4
Heyden	1½%	Jan. 2	Dec. 20
Liquid Carbonic	\$0.50	Feb. 1	Jan. 20a
Merek Corp.	2½%	Jan. 2	Dec. 17
Monroe	\$0.87½	Jan. 1	Dec. 15
Monsanto	.31½	Jan. 2	Dec. 10a
National Dist.	.50	Feb. 1	Jan. 15a
National Oil	\$1.00	Jan. 2	Dec. 21
com.	\$1.00	Jan. 2	Dec. 21
New Jersey Zinc	\$0.50	Feb. 10	Jan. 20a
Niagara Alkali	1½%	Jan. 2	Dec. 23
St. Joseph Stock Yards	\$1.50	Dec. 31	Dec. 21
St. Joseph Lead	\$0.15	Mar. 21	Mar. 10
Swann Corp.	\$0.15	Jan. 2	Dec. 15
Westvaco	\$1.75	Jan. 2	Dec. 15

Swann Corp. declared regular quarterly dividend of 15c a share payable Jan. 1, 1932, on 506,000 shares of A and B common stock. Earnings to Dec. 1 indicate that after larger deductions for depreciation than for 1930, net earnings for 1931 were about 90% of 1930 earnings.

Eagle-Picher Lead stockholders at a special meeting, Dec. 19 ratified resolution of directors to retire about 85,000 shares of firm's common stock now held in treasury, with consequent increase in surplus account.

National Oil Products directors declared extra dividend of \$1 per share in addition to regular semi-annual dividend of \$1 per share on common stock, both payable Jan. 2 to holders of record Dec. 21. An extra distribution of 50c. per share was made on this issue on July 1 last.



That Feeling of Being Watched

—N. Y. Herald-Tribune

St. Joseph Lead voted to pay quarterly dividend of 15 cents a share, against 25 cents quarterly, previously paid.

Dixon Crucible declared quarterly dividend of \$1, placing stock on a \$4 annual basis, against \$8 previously.

Celanese Corp. of America directors voted to defer semi-annual dividend of 3½% due Jan. 1 on the 7% cum. 1st partic. pref. stock, par \$100. From Jan. 1 1924 to and incl. June 30, 1931, regular semi-annual payments at this rate were made. Directors, however, declared usual quarterly dividend of 1¼% on 7% cum. prior pref. stock, par \$100, payable Dec. 31 to holders of record Dec. 15. This rate has been paid since and incl. July 1928.

Over the Counter Prices*

	Bid	Asked
J.T. Baker Chem.	9	13
Dixon Crucible	60	70
Merek pfd.	52	58
Petroleum Derivatives	3	6
Solid Carbonic, Ltd.	3¼	4¼
Tubize B.	37	42
Worcester Salt	83	88
Young, J. S. Co., com.	80	89
Young, J. S. Co., pfd.	99	..

*Close Dec. 31.

Acquisition

National Distillers Products sent letter to stockholders stating that negotiations are being completed for the acquisition by Distillers of outstanding 76,836 shares of 6% (\$100 par) cumulative preferred of its subsidiary, American Medicinal Spirits. This does not include 41,919 shares of this preferred already owned by Distillers.

Committee of preferred shareholders will form a corporation for the purpose of acquiring this preferred stock, which will then be exchanged for new preferred stock of National Distillers (which is to have a par value of \$40, paying \$2.50 cumulative annual dividends) on the basis of one share of old preferred for two shares of new preferred.

New preferred will be callable at par and will be convertible into National Distillers common stock share for share up to June 30, 1933, and convertible on the basis of 1¼ shares for one share of common up to Dec. 31, 1934. It also will be entitled, after the Distillers common stock has received dividends at rate of \$2.50, to a division with the common to a limit of 50 cents a share additional. Thereafter all earnings will accrue to common stock.

Charter of American Medicinal Spirits provides that no dividends may be paid on its 276,610 shares of common (all of which except 90 shares is owned by Distillers) until one-half of the preferred

FOREIGN STOCK MARKETS

London	
British Celanese	9s 9d
Celanese Corp.	£1
Courtaulds	£1¼
Distillers	43s 3d
Imperial Chemical	14s 1½d
Un. Molasses	3s 4½d
Paris	
Kuhlmann	297frs.
L'Air Liquide	520
Tubize Art Silk pf.	111
Berlin	
Berlin Stock Exchange is closed	

Company Reports

United States Smelting, Refining & Mining reports for 11 months ended November 30, 1931, net income of \$2,122,108, after interest, taxes and reserves for depreciation, depletion and amortization, equivalent, after dividend requirements on 7% preferred stock, to \$1.01 a share (par \$50) on 559,065 average common shares outstanding during the period. This compares with \$3,377,751, or \$2.93 a share on 620,562 common shares in corresponding 11 months of 1930.

For year ended December 31, 1931, company estimates net income at \$2,500,000, after taxes and charges, equal to \$1.44 a share on 558,000 average common shares. For year 1930, company reported net income of \$3,699,655, equal to \$3.54 a share on 563,855 common shares.

During the year to date, company has purchased 16,962 additional shares of its common stock at average cost of \$14.744 per share. This makes amount held in treasury 73,669 shares of common. Company also purchased 4,900 shares of preferred at average cost of \$38.048. These purchases were made in the open market.

After paying for these stock purchases, company estimates that at end of the year, net current assets will exceed \$12,400,000 as compared with \$11,674,000 at end of 1930.

Consolidated income account for 11 months ended November 30, 1931, compares as follows:

	1931	1930	1929	1928
Net after int. & tax. . .	\$4,250,606	\$6,017,170	\$6,567,315	\$5,584,422
Depr., depl. & amort. . .	2,128,498	2,639,419	2,110,867	1,975,494
Net income.	\$2,122,108	\$3,377,751	\$4,456,448	\$3,608,928
Pfd. divs.	1,557,252	1,560,373	1,560,373	1,560,373
Surplus.	\$564,856	\$1,817,378	\$2,896,075	\$2,048,555

Canadian Industrial Reports Loss

Canadian Industrial Alcohol Co., Ltd. for fiscal year ending September 30th 1931, shows two main changes from last year, one is a reversal from operating profits of \$523,770, to an operating loss of \$332,247. The other is a sharp writing down of assets particularly in the balance sheet valuations of the company's interests in subsidiaries. After the adjustments of inventory values of \$102,672, and other items, and the allowance for write-offs the profit and loss balance of \$3,257,641 has been changed to a deficit of \$3,041,071. The operating results are said to be due to the depression, and also to price cutting in the export market, and insufficient tariff protection against imports.

Liquid Carbonic and subsidiaries for fiscal year ended September 30, 1931, shows net profit of \$1,085,557 after depreciation, interest, federal taxes, etc., equivalent to \$3.17 a share on 342,406 no-par shares of capital stock, comparing with \$2,011,087 equal to \$5.87 a share on same basis, in preceding fiscal year. After deduction of management's profit sharing provision the 1930 net income was equal to \$5.22 a share. No similar charge was made against the 1931 net income.

Net sales for year ended September 30, last, were \$9,858,263, against \$13,626,530 in preceding year. Current assets on September 30 amounted to \$9,759,343, against current liabilities of \$1,556,531.

St. Joseph Lead, estimates profit for year ended December 31, 1931 at \$500,000 after taxes, interest, and depreciation but before provision for depletion, comparing with \$4,076,460 in previous year. After charging out \$1,900,000 for depletion the 1931 net loss is estimated at \$1,400,000, against net profit of \$1,509,991 in 1930.

Estimated consolidated income account of St. Joseph Lead Co. (December approximated) for year ended December 31, 1931, follows: Profit from operations \$1,992,000; interest \$362,000; depreciation \$1,130,000; profit \$500,000; depletion \$1,900,000; net loss \$1,400,000.

Hercules' 9 Months Net \$1,087,886

Hercules Powder reports net profit of \$1,087,886, for nine month period ending Sept. 30. After payment of regular preferred dividends there is available for period \$0.81 per share on 606,234 no par common shares. Gross receipts were \$15,523,274 as against \$20,416,664 for first nine months of 1930 when earnings were \$2.59.

Statement shows sound financial position, cash and securities of over \$10,000,000 being listed. Current assets of \$18,198,022 show 24.6 ratio to current liabilities. Company's surplus September 30 stands at \$12,566,611. Net profits per common share for third quarter were \$0.26 as compared to \$0.60 for the third quarter of 1930.

American Commercial Alcohol and subsidiaries report for quarter ended September 30, 1931, net loss of \$219,886 after charges and taxes, comparing with net loss of \$167,779 in preceding quarter and net loss of \$105,745 in September quarter of previous year.

For nine months ended September 30, 1931, net loss totaled \$262,827 after charges and taxes against net profit of \$70,186 equal to 18 cents a share on 389,494 no-par shares of capital stock in first nine months of 1930.

Callahan Zinc Reports Unfavorably

Callahan Zinc-Lead reports for quarter ended September 30, 1931, loss of \$15,031 after development costs, expenses, etc., but before depreciation and depletion, comparing with loss of \$16,348 in preceding quarter and loss of \$21.169 in September quarter of 1930.

For nine months ended September 30, 1931, loss was \$45,079 before depreciation and depletion, against loss of \$45,172 in first nine months of previous year.

Carman's 3rd Quarter \$51,277

Carman & Co., and subsidiaries report for quarter ended September 30, 1931, consolidated net profit of \$51,277 after charges and taxes, equivalent after dividend requirements on \$2 Class A stock, to 42 cents a share on 76,814 no-par shares of Class B stock. This compares with \$62,337 or 57 cents a share on Class B stock in preceding quarter.

For nine months ended September 30, last net profit was \$159,757 after charges and taxes or \$1.34 a share on Class B stock.

Period	3 Months Ended Sept. 30 '31	June 30 '31	9 Months Ended Mar. 31 '31	Sept. 30 '31
Net profs. after all chgs. . . .	\$51,277	\$62,337	\$46,143	\$159,787
Earns. per sh. on 76,814 shs. cl. B stk. (no par).	\$0.42	\$0.57	\$0.35	\$1.34

Patterson-Sargent, reports for year ended October 31, 1931, net profit of \$462,628, after charges and federal taxes, equivalent, after dividends paid on \$7 second preferred stock, to \$2.16 a share on 200,000 no-par shares of common stock. This compares with \$732,652, or \$3.42 a common share in preceding fiscal year. Surplus, after dividends, amounted to \$32,395 in year ended October 31, last against \$285,280 in previous year.

Balance sheet as of October 31, 1931, shows total assets of \$4,318,738, comparing with \$4,818,498 on October 31, 1930, and surplus of \$2,809,963, against \$2,776,951. Current assets, including \$1,536,650 cash and U. S. Government securities, amounted to \$2,950,610, and current liabilities \$347,376, comparing with current assets of \$3,397,912 and current liabilities of \$607,747 at close of preceding fiscal year.

Duval Texas Sulphur reports net income of \$197,933 after taxes and charges in the year ended August 31. This was equal to 30 cents a share on the common stock compared with \$231,541 or 46 cents a share in the preceding year.



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IN 1921 an event took place, unknown except to a small number of men. Yet the whole world now enjoys a variety of better food products because the clean white heat of the electric furnace was applied to the problem of making pure phosphoric acid.*

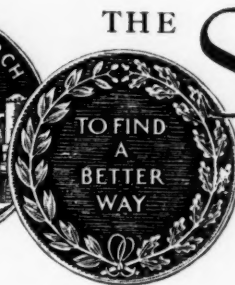
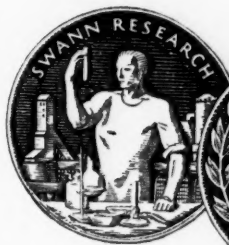
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The Trend of Prices

Commodity prices receded further in December with manufacturing activity at low point for 1931. Increasing stability made slight headway in the last week with industrial chemicals pointing the way. Chemical Markets' Average Price for 20 representative products held at November level while National Fertilizer and N. Y. Journal of Commerce Chemical indices were higher.

While it is not difficult to find a number of price reductions in December in the list of important industrial chemicals, it is encouraging to be able to point to a few increases in key products. Outstanding was the rise announced in all grades of alcohol. Such action was fully expected, but in many quarters it was felt that the proposed increase would be largely nominal. Such has not been the case and considerable volume has already been contracted for at the higher levels. The better tone in the fertilizer industry survived during the month nourished in the main by the continued hope that production schedules of the mixers will be scaled down to somewhere near actual requirements.

Stabilizing

Prices appear to be gradually but surely stabilizing. The increase in alcohol was immediately followed by a 2 1/2% increase in ethyl acetate and the possibility of a sympathetic increase in methanol is quite likely. Lead pigments went lower, sizable declines were registered in both grades of calcium chloride, citric and tartaric acids were off further under the stress of foreign competition, rosin prices dropped down to the lowest figures in 27 years and the downward course in bichromate prices continued unchecked.

Indices

Comparison of the price indices of the National Fertilizer Association for the week ending Dec. 26 with the corresponding week in November shows that fats and oils and mixed fertilizer goods were lower, while chemicals and drugs and fertilizer materials moved into higher ground.

Groups	Dec. 26	Week Ago	Year Ago
Fats and oils.....	55.8	55.2	59.1
Chemicals and drugs..	88.9	88.9	86.6
Fertilizer materials...	70.4	70.6	70.3
Mixed fertilizer.....	79.6	79.7	80.2
All groups combined.	65.1	65.0	66.8

Volume

Little was expected of December in the way of actual tonnages shipped and little enough materialized. Buyers are always eager to end up with small inventories and in 1931 the incentive was much greater to cut down to the bone. Shipments in December were smaller than for any of the other eleven months. Activity was mainly directed to closing contracts and in this

most houses experienced considerable success.

General Business

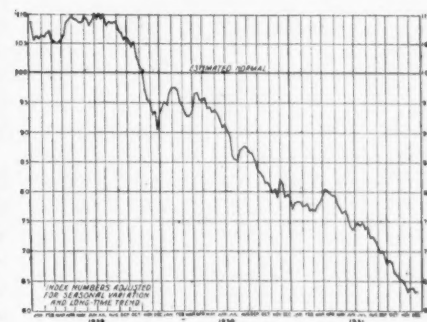
Christmas retail buying was in better volume than was expected in most quarters although with prices cut drastically little in the way of profits remained. At least the season served to move accumulating stocks and to encourage the general public slightly.

In the manufacturing lines the month was one of further recession. The steel and automobile industries showed no signs of early revival. Textiles and leather marked time in the in between season. The paper industry was still in the doldrums. Commodity markets generally weakened further in sympathy with the extremely bearish Wall St. sentiment. Here and there a bright spot appeared on the horizon and one of the most important of these was the concluding of the international copper agreement and the stiffening in the metal price.

Sentiment as the old year ended and the new began was mainly that of cautious waiting. Everyone would like to believe

that the turn of the recession came with the turn in the calendar but the outspoken optimism of a year ago was lacking. Yet we are 12 months further along on the road of recovery and it is not unreasonable to expect that no matter how the situation appears there must take place in the next three months a certain amount of seasonable increase in most manufacturing lines.

Business Activity Index shows signs of Firmness



The New York Times weekly index of business activity showed a net decline for December although some improvement manifested itself in the early part of the month.

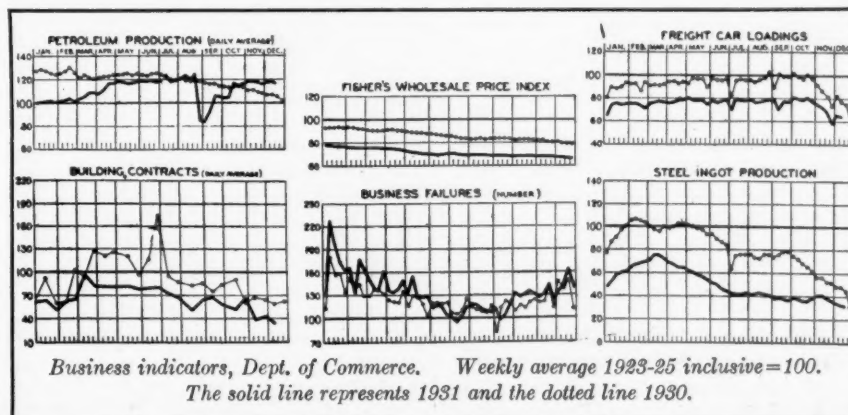
	Dec. 26	Dec. 19	Dec. 27
1931	1931	1931	1930
Freight car loadings.....	59.9	63.7	81.6
Steel mill activity.....	32.4	30.7	51.7
Electric power production	75.4	75.4	86.5
Automobile production...	39.8	33.0	67.1
Carded cotton cloth prod..	76.4	91.8	77.4
Combined index.....	62.1	63.3	78.9

*Subject to revision.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, November.....	68,867	80,142	136,754
†Brokers Loans.....	\$591	\$611	\$1,926
*Building Contracts, November.....	\$151,195	\$242,094	\$253,573
*Car Loadings, Jan. 2.....	581	613	713
†Commercial Paper, Nov. 30.....	\$174	\$210	\$448
Payrolls, November.....	56.2	59.4	75.1
*Mail Order Sales, October.....	\$52,280	\$45,955	\$68,878
Failures, Dun, November.....	2,195	2,362	2,031
*Merchandise Imports, November.....	\$150,000	\$169,000	\$203,593
*Merchandise Exports, November.....	\$193,000	\$205,000	\$288,978
Furnaces in Blast, Dec. 1.....	21.3	22.3	34.1
*Steel Orders, Nov. 30.....	2,933	3,119	3,639

*000 omitted. †000,000 omitted.



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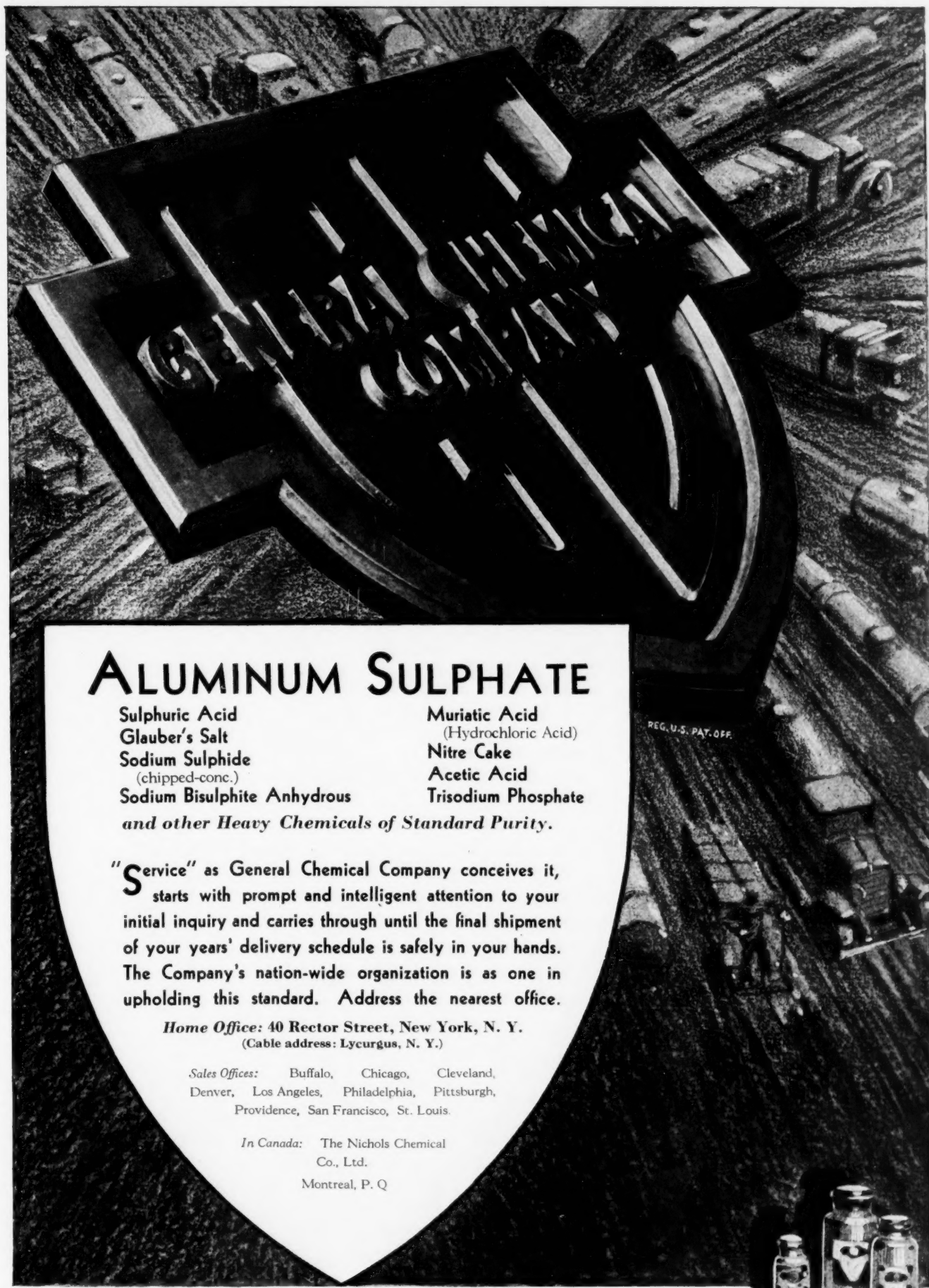
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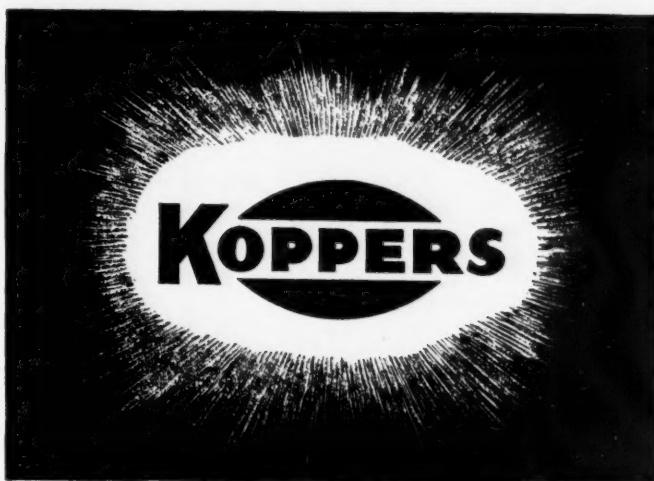
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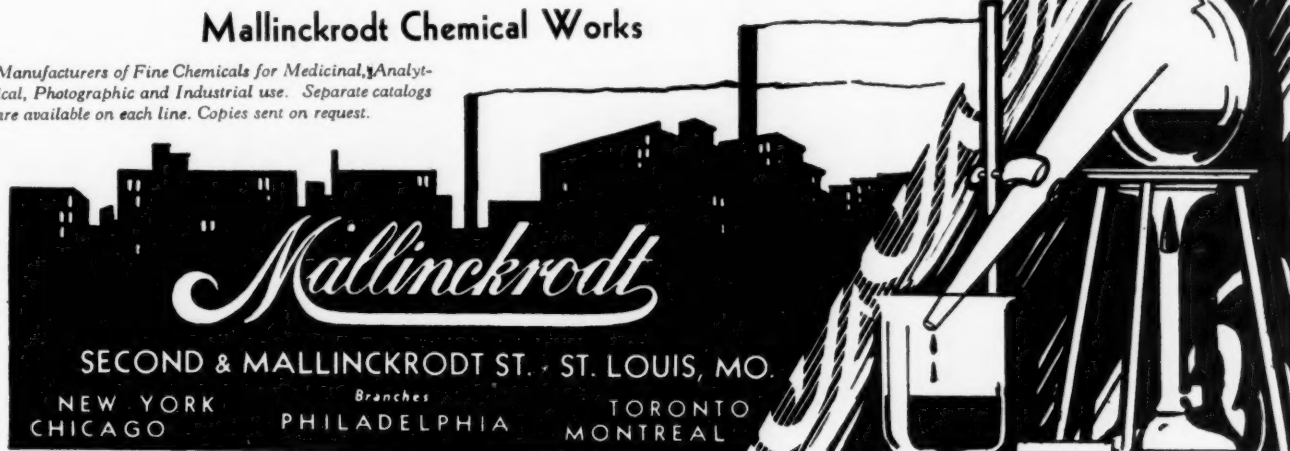
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WOOLWORTH BUILDING NEW YORK CITY

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"We"—Editorially Speaking

We do not need to introduce Stephen Leacock—in fact he is specially well equipped to do that for himself. We do believe that our readers will enjoy reading "Inflation and Deflation". He has sugar coated with his famous wit as bitter a pill as human beings have long been called upon to swallow. Perhaps he may arouse a more philosophical sentiment in our minds to accept the inevitable with a grin, and to go ahead, without crying over "spilt milk", but determined to "carry on" and to build anew on surer and better foundations. Stephen Leacock was born in England, but went to Canada as a youngster. Unimpressed with the possibilities of farm life, he took up school teaching after graduating from the University of Toronto. Impressed more with economics he then entered McGill and emerged a doctor of philosophy. But economics soon proved to be almost, but not quite as uninteresting as teaching. That restless something that often makes men find ultimately the thing that they like best and can do best, brought Stephen Leacock to the door of the editor of the Detroit Free Press. When he found that he could actually get real money for that which was just bursting from him anyway he thought the world had suddenly gone crazy. Two of his most famous books are "Literary Lapses" and "Nonsense Novels". He modestly admits that "the composers fell back from their task suffocated with laughter and gasping for air". He still continues on at McGill. "The emolument" says he, "is so high as to place me distinctly above the policemen, postmen, street car conductors. In point of leisure, I enjoy more in the four corners of a single year than a business man knows in his whole life."

To what ridiculous lengths abject fear may force people to go is well illustrated by the story of one bank failure which occurred not long ago in New England. A tremendously large construction job started and to offset the danger of holdup the contractors arranged to have one of the banks honor the pay-checks. The workmen were permitted to draw their pay in batches of a hundred so that the work might continue uninterrupted. The sight of a hundred men standing in line forced a run on the bank and finally to protect its assets, it was closed. It is a mighty good thing that when a German or two showed over the parapet, a decade or so ago, we did not stampede in the same way that many of us are doing now.

Just proving that there is "honor among thieves" or something of that sort, our contemporary "Plastics" went Shakespeare in reply to our Christmas Greetings. Dear Williams Haynes:

In these here parts

Your Chemical Marts

Are a monthly and mellowing bracer.

And your "Good, Better, Best"

Gives us zest for the test

Of next year, which some wail as a Placer.*

So we pledge you a "Skoal!"

From a not-flowing bowl—

When you're near, do drop in for the chaser.

SR.-R. C. Gilmore-Jr.

*i. e., Washout. (Cent. Dict.)

Our usually correct contemporary "Time" received an elementary lesson in the chemical characteristics of natural gas. Said Thomas D. Cabot, treasurer, Godfrey L. Cabot,

"Your statement (Time, Nov. 30, p. 42): 'Natural gas . . . is often disliked by housewives as it carbonizes more quickly, clogs stove burners, dirties pots and pans' endorses an erroneous impression. Correctly burned, natural gas produces no

more dirt than manufactured gas. The fallacy arises from the frequent misuse, for natural gas, of stoves designed for the lighter, quicker burning, manufactured gas. Complaints also arise when stoves adjusted for natural gas are used for manufactured gas. The change in adjustment is easily made and gas companies which change over from manufactured to natural gas usually send their own mechanics to adjust all of a consumer's equipment on the day of the change.

Our company purchases for its own consumption more natural gas than any other in the world."

While we are quoting Mr. Cabot may we extend our felicitations to Godfrey L. Cabot and those associated with him on the service record of his company which will shortly pass the half century milestone.

The extremely interesting table on page 37 showing the requirement of energy and chief solid raw material for fixing one metric ton of nitrogen was to have appeared in Mr. Kalish's article on world nitrogen capacity in the December number but was omitted for lack of space. The statistics were compiled by J. G. Pollett, Synthetic Ammonia Industry, at the second World Power Conference in Berlin, Vol. 2, p 145-164, 1930.

Luther Martin IV, author of the recent articles on lampblack, the last appearing in the December issue, writes that a stenographic error in typing his manuscript cast an erroneous meaning on part of the article. In the second paragraph, page 571, was printed, "by far, the greatest tonnage of carbon black goes into the paint industry." This is not correct. The word lampblack was to have been used in this sentence instead of carbonblack.

We hate to say we told you so, but only in the December issue did we warn the industry editorially that the abandonment of the Dye Census would be followed by propaganda looking towards the discontinuance of statistics on imports. Lo and behold, already the Treasury Department is permitting ships' masters, importers or exporters to request the Collector of the Port to withhold publication of manifests. This information is vital. No justification exists for withholding it. The voice of the industry must be raised to protect its rights.

COMING FEATURES

"That Russian Chemical Threat—Is It Real?" By Gareth R. V. Jones and F. A. Hessel.

"Safety Factors in Methyl Chloride Refrigeration" By J. R. Churchill.

"Shall We Turn To 'Merchandising' Chemicals?" By S. L. Willis.

"The Chlorine Industry Surveyed". By Joseph Kalish.

"France and Chemistry in 1931". By J. Debuigne, Director Revue Des Produits Chimiques and

An intimate survey of international cartels in 1931.

Also

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